DOCUMENT RESUME

ED 081 313 HE 004 441

TITLE	Individual Physician Profile. Final Report.
INSTITUTION	Wisconsin Univ., Madison. Dept. of Postgraduate Medical Education.
SPONS AGENCY	National Institutes of Health (DHEW), Bethesda, Md. Bureau of Health Manpower Education.
REPORT NO	NIH-70-4008; NIH-70-4030
PUB DATE	[71]
NOTE	146p.
EDRS PRICE	MF-$0.65 HC-$6.58
DESCRIPTORS	*Educational Programs; *Higher Education; *Individualized Programs; *Medical Education; Medical Evaluation; Medicine; *Physicians; Professional Education; Statistical Data

ABSTRACT

This document reports the procedures and data of a study designed to examine the hypotheses that medical practices do vary significantly. Detailed data on 76 participants were collected; three mechanisms were developed to determine the needs of primary care physicians. These mechanism were: subjective analysis by both participants and study staff, survey of participants and retesting of some participants to determine if their scores improved between the beginning and end of the study. Results indicated: (1) while there were similarities among individual physician's practices, they do vary substantially in terms of identifying individual educational needs, (2) it is possible to identify individual educational needs for medical specialists, (3) it is possible to identify individual educational needs for family-practitioners, (4) individual educational needs do vary, and (5) it is possible to design personal educational programs for physicians based on the health care they are called to deliver. (MJM)

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INDIVIDUAL PHYSICIAN PROFILE

Final Report

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DEPARTMENT OF POSTGRADUATE MEDICAL EDUCATION
University of Wisconsin

Research conducted under
Contracts NIH 70-4008 and
NIH 70-4030
Bureau of Health Manpower
Education, NIH

Individual Physician Profile

Final Report

INTRODUCTION

A major problem in providing continuing education for practicing physicians is identification of their educational needs. Consideration of this problem at the University of Wisconsin Department of Postgraduate Medical Education led to the thesis that physicians' practices contain many variables. These include the patients' problems and the physician's educational and cultural background, ethical standards, curiosity, awareness of his deficiencies, milieu of his practice and his own unique interests in health and disease. All are determinants of the type of practice he builds and quality of care he delivers.

If medical practices vary, then so must educational needs. Identification of these needs and the design of an individual educational program to meet them would ensure optimal utilization of the time of both learner and instructor, and ultimately benefit the patient.

Equally, there is some justification for the assumption that a physician's perceived need for continuing education may well be at variance with his real need. There are very few established mechanisms by which he can identify these real needs. The recent publication of self-evaluation examinations is an attempt to assist physicians in this identification. However, there is no mechanism in these self-evaluation examinations by which a physician can interpret his results in terms of the health care he is called on to deliver.

To test the thesis that medical practices vary significantly and consequent educational needs also vary, a research project was designed to:

1. Gather data to develop a profile of a physician's practice.
2. Test the physician in major areas of his practice.

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3. Provide educational consultation relevant to his practice profile and test results.

The research was conducted under contracts NIH 70-4008 and NIH 70-4030 with the Bureau of Health Manpower Education, National Institutes of Health, between June 1, 1968 and June 30, 1971. The first contract (June 1, 1968 - December 31, 1969) involved development of the procedures and resources required, and experimentation with the cooperation of 37 physicians. The second (January 1, 1970 - June 30, 1971) involved changes and improvements of procedures and resources from the first study period, development of new resources, and experimentation with the cooperation of 76 physicians.

This report will deal primarily with procedures and data from the second study phase, however background information and data from the first study phase will be presented, compared, and discussed when it is relevant to the end results.

DEVELOPMENT OF RESOURCES

In order to carry out the studies, it was first necessary to develop certain resources and methodologies. In phase one, this involved selection of an indexing system, development of a medical test bank, and adaptation of a computer program for test composition and administration. In phase two, it involved major changes in the indexing system, a new test bank, development of an educational resource index, and new computer programs to store and retrieve patient data, test questions, and educational resource information.

Classification System

Of the numerous indexing systems investigated, the International Classification of Diseases, Adapted (ICDA), gave the greatest promise of meeting the requirements of the study.

The ICDA has 18 major categories, which are further divided into 111 subcategories, and still further divided into 975 sub-sub-categories. In the first study phase, the indexing of patient information and test questions was in a system based on the 18 major categories. This did not prove sufficiently definitive. For the second study phase the patient data and test bank were indexed in the most definitive level, the 975 sub-sub-categories. When the educational resource index was developed, none of the three indexing levels was

suitable. The 18 major categories appeared too broad, and the 111 or 975 too specific. A variation, more suited to the apparent needs, was developed. This was done by taking the 18 major categories and extracting those diseases and conditions most frequently encountered by the 37 physicians in the first study phase and giving them unique classifications for educational resource indexing. This expanded the original 18 categories to 54 and has proved reasonably satisfactory.

By adhering to the ICDA, or adaptations of it, it is possible to make transitions from one process in the study to another and compare data at various points, since all are based on a common indexing system.

Test Bank

It was obvious at the start of the study that a comprehensive test bank, covering all areas of medicine encountered by primary care physicians, would be required. A major factor in the proposed research would be the ability to identify the educational needs of the physician by testing him within the context of the patient problems he was called on to solve.

In the initial study phase, questions were selected from a number of sources, coded in the ICDA, and entered into the test bank. This was done under a high level of time pressure, and it proved one of the weakest links in that study phase. While there were many factors involved in the unsatisfactory quality of this initial test bank, the primary problem was that many of the questions were not relevant to clinical practice. Consequently this test bank was discarded and a new one developed for phase two.

A major effort was made to establish this clinical relevance, and other procedures were instituted to promote the quality of the questions. Appendix A gives a detailed discussion of experiments conducted to assure relevance and develop efficiency in building the comprehensive resource required, since time was again an important factor.

A cycle was established for processing questions before they would be entered into the test bank. A large number of questions were written by physician staff members; others were obtained from a variety of sources (departmental test files in the medical school, the Ohio and Connecticut Academies of General Practice, various self-assessment tests, and the Professional Examining Service of New York City).

As an item was obtained, it was subjected to initial review by a staff member. Initially this was a physician, but experimentation indicated that non-medical specialist staff members could make the required judgments equally well. These judgments involved whether the question was potentially suitable for the purposes of the study, if it was in an acceptable format, and if the wording was clear. The questions that survived this review were assigned unique accession numbers and sent to practicing physicians. They were asked to make a number of judgments on each question (see Exhibit 1) and return them. If a question had serious defects in the judgment of the clinician, it was discarded. If it could be altered to eliminate the defects, this was done with a staff specialist making minor changes or a physician making changes requiring medical background. When all problems pointed out by the clinician were resolved, the question was again reviewed for format, grammatical construction, and spelling, and sent to a subject area specialist on the medical school faculty. He was asked to make judgments as to the scientific accuracy (see Exhibit 2). When all problems posed by the subject area specialist were resolved, the question was coded and entered into the test bank. The coding involved assignment of one or more categories of the ICDA, whether it was appropriate for general practitioners, internists, pediatricians, and surgeons, and a level of sophistication was assigned. These levels were defined as:

Level 1 - a common clinical situation and "on the spot" decision.

Level 2 - a decision requiring commonly available diagnostic tests and procedures.

Level 3 - a problem or technique requiring specialized training or diagnostic tests to manipulate the information.

An effort was made to attach a reference citation to each question in the test bank. The intent was to make the test a learning situation, so that the physician who failed to answer a question correctly would have a convenient method of studying that specific area of medicine in greater depth. It also gave the clinician an opportunity to confirm the scientific accuracy of the question if he challenged it. Brief experiments were conducted with third year medical students to determine the most efficient and effective method of obtaining references. They found this generally to be through use of the most current medical texts available; consulting current journals proved much less efficient.

Due to restricted funds and student time, references were not found for all questions in the test bank.

It was also intended that the test bank include a variety of questions utilizing visuals. It was thought this would add considerably to the flexibility and effectiveness of the testing, since visuals appear essential, or at least desirable, in some areas of medical education. A limited number of these items were developed, but this was abandoned since the time required to produce such a question proved substantially greater and the demands of the study dictated that all available time be spent in producing test questions in the most efficient manner.

A test bank of 2,020 questions was developed. Since many of these dealt with more than one of the ICDA sub-sub-categories, and were consequently given multiple codings, the number available for selection in composition of a single test was expanded to 3,755 with appropriate safeguards to assure that the same question was not assigned twice under different ICDA codings. (See Appendix B for a printout of the test bank).

Educational Resource Index

During the first phase of the study, once the physician's individual educational needs had been identified, the staff involvement essentially ended and the physician was left to work out his specific educational program as best he could. It had been intended that the educational consultant assigned from the medical school faculty would be deeply involved in this process, but experience indicated that these consultants did not have comprehensive knowledge of educational methods and media available and consequently could not be of much assistance. For this reason, it was decided to develop an index of available educational resources for the second study phase.

The first step was a letter of inquiry to all major organizations and associations in the country that sponsor continuing education for physicians, asking for information on upcoming events and available materials. The Continuing Education issue of the Journal of the American Medical Association (JAMA) proved a comprehensive source of conferences. In the normal course of its activities, the department is informed of educational events and materials as they are scheduled and produced, and a procedure was established whereby this information was included in the index as it was received in the office.

The intent was to develop as comprehensive a listing as possible, with the realization that limited funding and staff time would not permit accumulation of all educational resources available in the country. Equally, it was not considered possible to make judgments on the quality of the listings.

As educational resource listings were obtained, each was coded and entered into the computer, under the following format:

1. Home study
   a. Audio-visual materials
   b. Programmed instruction
   c. Computer assisted instruction
   d. Texts and journals
2. Away study
   a. Conferences
   b. Apprenticeships

Limitations were arbitrarily placed on the inclusion of television video tapes and 16 mm films, since the equipment to use these resources is not usually readily available or usable for most clinicians. Equally, the texts and journals were essentially limited to the Core Content Library developed by Norman Stearns, M.D., of Postgraduate Medical Institute, Boston, Mass.

Once an educational resource was selected, it was coded in an adaptation of the ICDA, and in the format given above, and entered into the computer. It could now be readily related to the patient data and test results, so that it could be retrieved in virtually any combination of that format and the ICDA codings. The index is updated each month so that new entries become readily available and obsolete ones are deleted. (See Appendix C for a printout of the index).

Computer Programs

For the first study phase, it was possible to adapt an existing program of the University of Wisconsin Computing Center to meet the anticipated needs of the study. This was an on-line, interactive program, with the physician receiving his test on a portable teletype in his office directly from the computing center via telephone lines. General composition of the test was by hand tabulation of patient data in the 18 ICDA categories, with selection of specific questions done randomly by the computer.

Technical problems were of such magnitude that this was abandoned for the second study phase, with testing to be conducted by the more reliable process of paper, pencil, and the U.S. mails. This major change, and other factors evolving from the first study phase, made it necessary to develop new computer programs for the study.

The first involved storage of both the patient data and the test questions, with a sub-routine for retrieval of individualized tests. The second involved storage and retrieval of the educational resources. Existing programs were adapted for retrieval of cumulative physician and patient data and cross tabulation of data. (See Appendix D for a description of the first program and Appendix E for the second).

OBTAINING PARTICIPANTS

In April of 1968 the principal investigator presented the goals and procedures of the study at a series of regional continuing education meetings in Wisconsin and invited physicians to take part. In addition, a number of telephone contacts were made with physicians who had been generally supportive of departmental programs in the past. A goal of 30 participants was set for the first study phase. Although difficulty in recruiting participants was anticipated, little persuasion was required. Thirty-seven clinicians took part in that phase; the distribution was 28 in general practice, four in internal medicine, four pediatrics, and one surgery.

In the second study phase, the goal was to increase the number of participating physicians to 60. The initial participants were contacted and 35 of the original 37 agreed to continue. They were also asked to recommend or recruit additional participants, which many did. In addition, a number of physicians who had heard of the study contacted the department to volunteer. In these ways the number grew to 76 for the second study phase. The distribution was 63 general practitioners, 5 internists, 7 pediatricians, and 1 surgeon.

No attempt was made in either study phase to recruit a sample representative of medical practitioners in Wisconsin. Participants were either pre-selected on the basis of past associations, recommended, or volunteers.

COLLECTION OF PRACTICE DATA

To examine the thesis that medical practices do vary significantly, it was necessary to develop methodology by which data could be collected and compared. The method adopted was based on categorization of tentative diagnoses in the ICDA for every patient contact by the physician during a specific time period. A patient contact was defined as a physician-patient interaction which required a medical decision to be made. Such contacts could be by office visit, hospital rounds, home visit, or over the telephone. Cumulative data would then give a profile of the physician's practice.

Three methods of collecting patient data were explored.

1. During the first study phase, a project specialist with experience as a medical secretary spent a week in the physician's practice setting and received information directly from the physician on each patient contact.
2. During the second study phase, data was voice recorded into a dictating machine by the physician one day a week for four weeks, and then transcribed at the central office.
3. In both study phases, a number of participants were asked to make advance predictions of their practice profiles. These were then compared with actual patient data to determine whether they could define their practices with sufficient accuracy to make data collection unnecessary.

Patient Data

In order to determine a physician's practice profile, it was decided that eight items of information would be collected on each patient contact:

1. Age of patient
2. Sex of patient
3. Method or place of contact
4. Significant presenting signs or symptoms
5. Major tentative diagnosis
6. Contributing diagnoses

7. Tests ordered

8. Treatment and disposition

Age, sex, method or place of contact, major diagnosis, and contributing diagnosis were all keypunched and entered into the computer, along with the patient number, physician's code number, and date the contact was made. The major diagnosis and contributing diagnoses were coded in the ICDA, and it is from these the physician's practice profile was constructed. Significant presenting signs and symptoms, tests ordered, and treatment and disposition were not computerized; this information was used by the project staff if they wished to examine in detail the physician's rationale in diagnosis and initial treatment of his patients.

Physician Data

Additional information was collected about the physician so that various cross tabulations of patient data could be made, and certain judgments made by the educational consultant. The form used is attached as Exhibit 3. Important items extracted from this form included:

1. Medical specialty

2. Age

3. Years in practice

4. Size of medical community

5. Type of practice

6. Size of patient community

7. Type of community

8. Postgraduate training

These items were all coded and entered into the computer.

Visit to the Physician

A project specialist was recruited with the primary responsibility of collecting the physician and patient data. Within general guidelines, she was responsible for developing her own methodology and procedures to accomplish this. In the first study phase, the visit was of one week's duration; in the second it

involved about two hours' time, with reliance on machine dictation of data. Since both proved satisfactory for purposes of the study, and the latter is more economical, discussion will center on that method.

Once recruitment of a physician participant was accomplished by a physician member of the project staff, it was the responsibility of the specialist to contact the physician and make detailed arrangements for his participation. This involved selection of a date on which to begin data collection and a visit to the physician's office to establish rapport, explain the study, and give specific instructions on data collection procedures to the physician and his secretary or nurse. Prior to this visit the specialist completed as much of the Physician Information form (Exhibit 3) as possible from such sources as the American Medical Association Directory. She would then visit the physician to gather the additional data desired, and discuss the data collecting procedures with him and his nurse or secretary. In certain instances it also involved assisting the physician in the procedure to predict his practice profile in advance for later comparison with the patient data. Generally this involved spending an hour with the physician and a half-hour with his secretary or nurse. The specialist would leave a dictating machine and a supply of tape cassettes with them and confirm the dates on which data was to be collected.

Dictation of Patient Data

The physician was given some latitude as to the procedure he followed in actually dictating the data. It was suggested that he do this after every 3-5 patients, but some waited until the end of the day and then dictated from the charts and records of telephone calls that had accumulated. It was required that the data be dictated in four consecutive weeks, one day each week. Normally, the physician would record data on Monday of the first week, Tuesday of the second week, and so forth. One day would be omitted because of the tradition of taking a day or afternoon off each week, and data was not collected on weekends.

The physician was provided with a miniature cassette recorder (Norelco Model 85 Pocket Memo) which utilized a 20-minute cassette, 10 minutes per side. Normally, one cassette would suffice for a full day's patient data. This procedure proved quite satisfactory to both the physician and project staff. While definitive data is not available, it apparently took 30-60 minutes each day to record patient data. Data was quite complete, since the list of eight items desired was

taped to the device as a constant reminder and reference as the physician dictated.

Transcribing of Data

When the physician completed dictation of one day's patient data, he was asked to return the cassette to the project office. On receipt, it was transcribed by hand onto the Daily Record form (Exhibit 4). This form was developed for the first study phase and proved satisfactory to the point that only minor changes were required for the second study phase. Experiments were carried out as to the efficiency of various types of individuals and the level of medical knowledge and training required to transcribe the data. If was found that an intelligent college student, trained on the job in medical terminology and spelling, could accurately transcribe the data. It was then given to another project specialist (a registered nurse) who would assign the ICDA codings to the major and contributing diagnoses. Initially the nurse's codings were confirmed by a physician until this was found to be unnecessary. As the project staff gained experience, the nurse was able to delegate coding to the student transcriber, with review of the results by the nurse before they were keypunched.

Development of Practice Profile

With the data on the physician and his patient contacts entered into the computer, information could now be obtained as to his practice profile. This would give the physician and project staff information on:

1. Total number of patient contacts in four days.
2. Average number of patient contacts per day.
3. Age ranges of patients.
4. Proportion of place or method of patient contact.
5. Distribution of patient contacts within the 975 most definitive categories of the ICDA.

From this latter information, an appropriate test could be developed.

TESTING

In order to best serve as a diagnostic tool, to give the physician and his educational consultant some data on which to design an educational program, it was thought the test should:

1. Be directly related to the volumes and distribution of patient contacts within the physician's practice profile.
2. Increase in sophistication as the volume of patients with a specific disease or condition increased in the physician's practice profile.
3. Be sufficiently broad to cover the major part of a physician's practice, yet give sufficient depth that judgments could be made in specific disease categories.
4. Be of a reasonable length and time commitment for the practicing physician.

It is important to note that the testing mechanism used primarily measures instant recall of factual information, and in some cases the theoretical application of that knowledge to a patient care situation. In the view of the project staff, it does not purport to measure the quality of medical care delivered by the physician participant to his patients. Consequently, the test is considered a useful diagnostic tool, but not a reliable measurement of actual deficiencies.

Test Composition

The procedure by which an individual test would be constructed by the computer was based on the criteria listed above. As previously indicated, the result was less than satisfactory during the first study phase. Therefore, a more complex method was developed for the second phase.

Both patient data and test questions are indexed in the 18 major categories of the ICDA, the 111 sub-categories, and the 975 sub-sub-categories. For example, a patient contact with a major diagnosis of diabetes mellitus would be coded 3-B-250, with the designations signifying:

Category 3 - Endocrine, Nutritional & Metabolic

Sub-category B - Diseases of other Endocrine Glands

Sub-sub-category 250 - Diabetes Mellitus

Each test question dealing with diabetes mellitus would have an identical coding, 3-B-250.

The first step in test composition required that the computer go to the one (of 18) major ICDA category where the physician had the greatest volume of patient contacts and assign questions in any of the 975 sub-sub-categories where there were three or more patient contacts. The level of sophistication of the questions would increase proportionately to the number of patient contacts in the sub-sub-category. For example, if there were five or more patient contacts the computer would assign three questions at level three (the most sophisticated), one question at level two, and one at level one. If there were only three patient contacts in the sub-sub-category, it would assign no level three questions, one level two question, and two level one questions. If there were fewer than three patient contacts, no questions would be assigned at that time. A maximum of five and minimum of three questions would be assigned in any sub-sub-category at this point.

When the computer had scanned the data and completed the above, it would move on to the major ICDA category (of 18) with the second greatest volume of patient contacts and repeat the process, and so on through the 18 major categories assigning questions in any sub-sub-category where there were three or more patient contacts. At such time as the accumulated test questions reached 125, the test would be complete.

This process was expected to meet all four of the criteria listed on page 17. Experimentation indicated that a physician could complete a 125-question test in about two hours, thus the limitation placed on the computer as to total accumulated questions.

If the above process was completed and the total assigned questions was less than 125, the computer was directed to repeat the process for all sub-sub-categories with two patient contacts, and if necessary those with one patient contact. In this way, the additional questions were thought to give additional supporting test data in these of the 18 major categories constituting the major part of the physician's practice.

Test Administration

After the computer had determined test composition, it would print out the test items and an answer sheet (see Exhibit 5). The left half of the answer sheet would give the information necessary to score and analyze the test results and the right half a form for the physician to use in taking the test. The right half was detached, covered with transparent plastic, and the answers covered with opaque paint. In taking the test, the physician would scratch off the paint over what he thought was the correct multiple choice option and would be immediately informed if he was right or wrong, and if wrong what the correct option was. He would return only the answer sheet for scoring.

Test Analysis

After the test was scored, the project staff would prepare a "gestalt" sheet giving an overview of the practice profile and test results by ICDA category (see Exhibit 6). This would be provided to both the physician and his educational consultant, along with detailed information on the test results by ICDA sub-sub-category.

It is important to note that the physician is not compared with a pre-determined scoring level, or with other physician participants, but rather is in competition with himself. The significance of the test data is in relative performance in the various ICDA categories, with those where he did less well hopefully indicating areas where continuing education effort could bring about greatest improvement.

EDUCATIONAL CONSULTATION

The concept of educational consultation was not clearly defined at the beginning of the study, and it was anticipated that the mechanics would evolve during the study. The one preconception was that the practicing physician would require some assistance in analyzing his own data and developing a meaningful continuing education program.

In the first study phase consultation was provided by calling on members of the medical school faculty. An attempt was made to match the consultant's field of expertise to the practice profile of the clinician. The plan was to have the consultant visit the physician in his practice setting to discuss the data and

design a continuing education program, and then establish a continuing relationship which would provide the clinician an entry point into academic medicine so that he could discover the various ways in which his educational needs could be met. This was successful in that it did establish the desired rapport in many cases. It also provided insights into the clinical practice of medicine for the faculty member. However, the faculty consultants found themselves ill-equipped to recommend specific courses and materials for study; consequently the consultation did not appear to be greatly beneficial to the participant except in limited cases.

For the second study phase, it was decided to limit the consultation role to a few faculty members who were fully acquainted with the goals and administrative details of the study, and to provide them and the physician with the index of available educational resources.

As it evolved, in both phases of the study, the objective data of the practice profile and test results were used along with the intuitive judgments of the consultant and practitioner to arrive at and carry out the educational program. This was an informal, cooperative relationship between the two.

The procedure was initiated when the practice and test information was complete. Both the consultant and physician were provided advance copies of the data. The key item of the report was the "gestalt" sheet which gave an easily observable overview of the profile and test results. Both also received a general analysis of the data. In addition, the consultant had detailed information of test results by ICDA sub-sub-category and a copy of the test so that he could examine this in great detail if desired.

The consultant would then spend about two hours visiting the physician in his practice setting. The visit included both a detailed discussion of the data and an informal discussion of the physician's practice and his views of that practice. Such questions as: "What part of your practice do you enjoy the most?" and "What part do you enjoy the least?" often added meaningful information to the objective data provided. The consultant and physician would then cooperatively develop a personalized plan of continuing education for the physician and examine the educational resource index to determine if there were suitable events or materials available.

Upon return to the office, the consultant would provide a report of the visit (see Exhibit 7) to the project staff and a final report would be prepared for the physician (see Exhibit 8). This included printouts of the appropriate sections of the educational resource index, with those items thought to be most appropriate indicated. The consultant would then send the final report to the participant along with a personal letter summarizing the recommended educational program.

EVALUATION

In a sense, many of the procedures in the study provide a sort of evaluation, related to process analysis. This involves the question of whether the study staff did in fact carry out those procedures which they set out to do, and did they effectively explore various alternatives of accomplishing the same thing more effectively and efficiently. The answers to the various facets of this question will be provided in the body of the report.

A second, and more important, question is whether the process did in fact provide a mechanism to identify and meet individual educational needs of primary care physicians. Three mechanisms were used in an attempt to determine this:

1. Subjective analysis by both the participants and study staff.
2. Survey of participants.
3. Re-testing of some participants to determine if their scores improved between the beginning and end of the study.

All three methods were used at the conclusion of the first study phase. The subjective analysis was obtained by holding a day-long meeting of all participants, consultants, staff and representatives of the Bureau of Health Manpower Education. The input of the participants was such that it led to major changes in the procedures during the second study phase.

The survey of participants also rendered encouraging data.

The re-testing was limited to six of the 37 participants in the first phase, since the inadequacy of the test bank led to uncertainty as to the validity of the results. The test scores of those six, however, did illustrate improvement except for one participant who did not carry out his educational program, and he showed a decrease.

In the second study phase the participants were surveyed, (see Exhibit 9) but not re-tested. It has not been possible to hold a meeting of all participants because of shortage of funds. It is still the hope of the study staff to hold such a meeting, but it is not anticipated prior to submission of this report.

A third type of evaluation, in a sense, relates to one of the goals of the second study phase - development of a reasonable program which could be offered to a significant number of physicians on a fee basis. When this is offered, the willingness of physicians to pay for such a service, and their satisfaction on completion of the process, will be still another measure of the success or failure of the research project.

RESULTS

Data Collection

In general, the data collection efforts during both phases of the study not only rendered most of the information required to meet the objectives of the study, but resulted in accumulation of data which has broad application beyond the limits of this research.

Physician Data

As previously described, considerable data were gathered on each participant in the study, either from directories or the physician himself. The information collected was of use both to the consultant (to give him a more complete picture of the participant and his practice setting), and in analysis of the data.

Detailed data on the 76 participants is attached as Exhibit 10. Summary information is as follows:

Table 1

Medical Specialty

	Number
General Practice	63
Pediatrics	7
Internal Medicine	5
Surgery	1
Total	76

Table 2

Age of Participants

	Years								
	26 to 30	31 to 35	36 to 40	41 to 45	46 to 50	51 to 55	56 to 60	61 to 65	Average Age
General Practice	2	12	16	18	9	2	2	2	44.0
Pediatrics		2		2	2	1			43.0
Internal Medicine		2	1		2				40.2
Surgery		1							34.0
Total	2	17	17	20	13	3	2	2	41.5

(Note: Data were also collected on "Years in Practice" but the correlation is so close with physician age that the data are not reported here).

Table 3

Type of Practice
(by number of participants)

		Group			
	Solo	Uni-Specialty Under 5	Uni-Specialty Over 5	Multi-Specialty Under 5	Multi-Specialty Over 5
General Practice	8	22	5	4	24
Pediatrics					7
Internal Medicine					5
Surgery					1
Total	8	22	5	4	37

Table 4

Size of Patient Community
(by number of participants)

	Population in 1,000s							
	Less than 2.5	2 to 5.4	5 to 9.9	10 to 24	24 to 49	50 to 99	100 to 499	Over 500
General Practice	13	15	15	5	6	0	8	1
Pediatrics			3		1	3		
Internal Medicine					1	4		
Surgery				1				
Total	13	15	18	6	8	7	8	1

Table 5

Office Setting
(by number of participants)

	Business District	Residential	Suburban Business	Rural Residential
General Practice	24	26	10	3
Pediatrics	2	5		
Internal Medicine		3	2	
Surgery		1		
Total	26	35	12	3

Table 6

Postgraduate Training

	Years						
	0	1	2	3	4	5	6
General Practice	41	17	5				
Pediatrics	1		4	2			
Internal Medicine				2	2		1
Surgery					1		
Total	42	17	9	4	3	0	1

As previously indicated, no effort was made to obtain a study sample representative of Wisconsin physicians. Various comparisons of the study group with general Wisconsin data are as follows:

Table 7

Age Distribution
(by per cent)

(Participants compared with Wisconsin direct care physicians)

	Years									
	26 to 30	31 to 35	36 to 40	41 to 45	46 to 50	51 to 55	56 to 60	61 to 65	65+	Ave. Age
Participants	2.6	22.4	22.4	26.3	17.1	3.9	2.6	2.6	00.0	41.5
Wisconsin M. D. s	1.8	9.7	16.5	16.4	16.4	10.8	9.5	8.8	10.2	46.0

Table 8

Distribution by Specialty Practice
(by per cent)

(Participants compared with Wisconsin physicians in same specialties)

	General Practice	Pediatrics	Internal Medicine	General Surgery
Participants	82.9	9.2	6.6	1.3
Wisconsin M. D. s	53.4	8.3	20.2	18.1

Table 9

Distribution by Type of Practice
(by per cent)

	Solo	Group	Other
Participants	10.5	89.5	0.0
Wisconsin M. D. s	40.2	45.2	14.6

Consequently, the 76 physicians participating in the study, when compared with representative samples, are younger by an average of 4.5 years, include a disproportionately large number of general practitioners, and tend more to group practice.

No comparative data were available to make similar determinations concerning the more definitive listing of large and small group practitioners, unispecialty or multi-specialty group practice, size of patient population, office setting, or number of years of postgraduate training.

In summary, the participants average 41.5 years of age, with two-thirds between 31 and 45 years of age. They are all primary care physicians, but are mostly in general practice, with limited representation in pediatrics and internal medicine and one surgeon.

All of the specialists and most of the general practitioners in the study are in group practice, with only eight solo practitioners involved. Those in groups are almost evenly divided between small and large groups and unispecialty (all general practitioners, all pediatricians, etc.), and multi-specialty groups.

Approximately one-third have their offices in central business districts and one-third in residential areas. Ten have offices in suburban business districts and three in residential areas developing on the outskirts of communities.

More than half the participants did not have any formal postgraduate training beyond internship; the remainder took residency training of one to six years. Of interest are the 22 general practitioners who had one or two years of residency training and 1 pediatrician who had none.

The data reported here about the physician participants has interest and value to the project staff, particularly to the educational consultant, and in cross-tabulation of cumulative data. It has little interest to the individual practitioner, and was not utilized to any great extent in planning personalized educational programs. However, there is merit in its collection since the cumulative information has application beyond the limits of the study and in his context it makes the patient data and test results more meaningful.

Patient Data

As previously indicated, two methods of data collection were utilized during the study. Also, physicians were asked to predict their profiles to determine if the data collection phase could be dispensed with.

There was apprehension that the change from having a medical secretary collect data in phase one to dictation of data by the physician in phase two would

result in loss of data. It would appear that this occurred to a limited extent, if at all.

This conclusion was drawn after examining the data and contacting a number of physicians. Comparison of volume of patient contacts for the two study periods is:

Table 10

Average Daily Volume of Patient Contacts

	Office	Phone	Hospital	Home	Total
First Study Period	28.7	15.7	9.3	0.4	53.9
Second Study Period	28.0	8.9	9.8	0.5	48.2
Difference	- .7	- 8.9	+ .5	+ .1	- 8.7

The decrease in total average daily patient contacts between the two study periods is almost identical with the decrease in telephone contacts. The trend was detected early in the second study phase, and individual physicians contacted to determine if they were neglecting to record all of their telephone contacts. This revealed that a major factor was a change in practice procedure by some of the physicians who participated in the first phase; they were now having their nurse receive telephone calls, handle those within the scope of her training, and pass on only those requiring the attention of the physician. There is still a feeling that some of the decrease is due to missing data, but there is no way to document this.

Since the results under the two methods correlate closely, the relative cost becomes a determining factor. Identifiable costs in travel and supporting a medical secretary in the community for a week resulted in an average of $235 in direct costs of obtaining data for one participant during the first study phase. This decreases considerably when multiple members of a group are profiled concurrently. In the second method, a staff member did visit the physician in his community, but only on one day. Therefore, the cost of this visit and transcribing of the data in the office came to $44.25 in identifiable costs for each participant in the second study phase. These costs decrease also when multiple members of a group can be contacted in a single day, but the cost of transcription remains constant per physician. The second method also is thought to give more

representative data, since it permits sampling by recording data one day a week for a month, rather than four days in a single week.

The conclusion, primarily on the basis of cost, is that the method of choice in gathering patient data is by dictating machine, and that this can be done with relatively little loss of data. It is entirely possible that the visit of the staff member to orient the physician and his secretary may be dispensed with; this is a probability with physicians who have previously participated in the project.

Prediction of Profile

In an attempt to determine if physicians could predict their practice profiles with the degree of accuracy required for the procedure, experiments were conducted during both study phases.

During phase 1, 17 participants were asked to record in advance the percentages of their practices they thought would fall into each of the 18 ICDA categories.

During the second phase, 50 participants were asked to select the 6-8 ICDA categories in which they thought they would see the most patients, and then specify the numbers of patients they would predict under the sub-sub-categories in those major categories selected.

The results were as recorded in Table II on the following page.

In both phases the majority of the participants were able to predict between 62.5 and 75.0 per cent of the categories which constituted the major portions of their practices.

It had been anticipated that those physicians who participated in phase 1 would be more successful in predicting their profiles in phase 2 than the new participants. This did not prove to be the case.

Effect of Utilizing Predicted Profiles

Any judgment based on the data in Table 11, whether approximately 70% accuracy in predicting practice profiles is acceptable, would be subjective. A more objective approach would be to consider the effect on test composition, since this is the major use of patient data in the study.

Table 11

Prediction of Practice Profiles
(by number of participants)

Per cent Accuracy	Categories Predicted Accurately	Phase One	Phase Two	
			Repeat Participants	New Participants
25.0%	2 of 8			1
28.6%	2 of 7		1	1
42.9%	3 of 7			1
50.0%	4 of 8	1	2	1
55.5%	5 of 9			1
57.1%	4 of 7			2
60.0%	6 of 10			1
62.5%	5 of 8	4	4	6
71.4%	5 of 7		3	2
75.0%	6 of 8	10	7	9
83.3%	5 of 6		1	
85.7%	6 of 7			1
87.5%	7 of 8	1	3	3
100.0%	8 of 8	1		
		17	21	29
Average Accuracy		72.8%	69.7%	66.1%

During phase 1, utilizing the data collected by the medical secretary on the 17 physicians who also predicted their profiles, the best result was one physician who was tested on 98.2 per cent of his practice; the worst result was one who was tested on 71.5 per cent. Had the tests been composed on the predicted profiles, the best result would have been 78.6 per cent and the worst 46.0. Consequently, the loss in diagnostic effectiveness of the testing procedure would have ranged between 19.6 and 25.5 per cent for the 17 physicians involved.

At the end of phase 1, an analysis of the data on predicted profiles led to the conclusion that it was not sufficiently accurate or consistent to provide a substitute for recording patient data. At that time a 100 question test was administered, and the net effect would have been to reduce the number of questions related to actual patient contacts to a range of 46-79. There was already doubt that 100 relevant questions represented an adequate test; the lower number appeared unacceptable.

The results during phase 2 were even less encouraging. The percentages of actual practices which would have been covered by tests based on predicted profiles ranged from 80.0 to 28.0 per cent. The actual tests, based on the data collected by dictating machine, covered between 94.5 and 80.0 of their practices. The loss in diagnostic effectiveness would have ranged between 14.5 and 56.0 per cent.

More important, in phase 2 the test formula assured that all 125 questions on the test related to actual patient contacts. If the predicted profiles were utilized in test composition this would have been reduced to 100 in the best instance and 35 in the worst.

Conclusion

On the basis of this data, predicting of practice profiles would be an acceptable substitute for actual recording of data only if cost became the crucial factor. One might accept the reduced effectiveness if the only other alternative were to discontinue the entire program because of the cost involved.

There is some evidence that physicians see value in the process conducted on the basis of profile prediction. This was attempted in an issue of Patient Care magazine. A description of the process was given and the reader allowed to predict his profile and then take one of three standardized tests. The test results were mailed in and the appropriate portion of the Educational Resource Index mailed back to the physician. A total of 143 physicians took part, but there are no data available to indicate how useful this was to them. The experiment was conducted and financed outside the basic contract, and is reported here as a matter of interest.

Limitations of Patient Data

There are limitations to the methods used in collecting patient data. The first is that the most important item is the major tentative diagnosis. This assumes that this initial diagnosis is correct, that the physician does not change his diagnosis as the result of later evidence, or that he has not completely misdiagnosed the case. While it is an admitted weakness, it is not considered feasible to follow the progress of patients and change the data if the diagnosis changes, or to have another physician "second guess" the participant on his initial diagnosis, when he has not actually had contact with the patient.

The second problem arises from the fact that only sampling of patient data is done. In phase 1 this was four days out of a week; in phase 2 four days out of a month. Some participants have indicated they feel a greater volume of data over a greater time span would more accurately reflect their practices. It becomes a question of what is acceptable in terms of cost and demands on the physician's time, as opposed to the ideal. This may be partially alleviated for the physician who adopts Individual Physician Profile as a continuous process, and participates over a number of years. In this way, by selection of data collection periods, seasonal changes in practice could be detected and stable areas of practice confirmed.

General Patient Data

From the data collected, it was possible to furnish each participant with general information on his practice:

1. Age ranges of his patients
2. Sex distribution of his patients
3. Method or place of contact
4. Distribution of patients by diagnosis

During this study it was not possible to give the participant comparative data so that he could analyze his practice in relation to others. With the cumulative data of phase 2, it will be possible to do this in the future. The cumulative data is as follows:

Table 12

Age Ranges of Patients
(Average Patient Contacts Per Day)

	Total	0 to 14	15 to 39	40 to 64	Over 65	Not Reported
General Practice	50	12	16	11	8	3
Pediatrics	46	38	6	0.4	0.1	2
Internal Medicine	31	0	6	10	8.4	6
Surgery	37	4	5	14	10	4
Total Average	48.2	14	14	10	7	3

Table 13

Sex of Patients
(Average Patient Contacts Per Day and Per cent)

	Male	%	Female	%	Not Reported	%
General Practice	19	38.6	29	57.1	2	4.2
Pediatrics	20	43.0	20	43.0	7	15.0
Internal Medicine	13	43.0	16	51.0	2	5.8
Surgery	11	30.0	24	66.0	1	4.0
Total Average	18	39.1	27	55.6	5	5.3

Table 14

Method or Place of Contact
(Average Patient Contacts Per Day and Per cent)

	Office	%	Phone	%	Hosp.	%	Home	%
General Practice	30	60.4	9	17.7	10	19.7	0.6	1.1
Pediatrics	26	56.0	12	26.0	8	16.0	0.0	0
Internal Medicine	16	51.0	6	18.0	9	29.4	0.0	0
Surgery	5	14.0	8	22.0	20	56.3	0.0	0
Total Average	29	59.5	9	18.4	9	19.3	0.5	1.0

Of this general data, the most useful to the participant has invariably been the breakdown of the method or place of patient contact, and particularly the volume of medicine practiced over the telephone. In many instances it has resulted in significant changes in office procedure, and each participant is now given a reference where he may obtain an office guide for telephone answering procedures.

As with most research, there is a great deal of serendipity involved in the project - a significant amount of valuable but unanticipated information has evolved from the data. However, since it is not directly related to the main objective of diagnosing and meeting individual educational needs, it will be presented later in this report.

Patient Data by Diagnoses

All of the patient data reported here deals with the second study phase, except in instances where comparison with data from the first study phase illustrates a particular point.

The 76 physicians in the second study phase provided health care for 14,507 patients during the 301 days of practice on which data were collected. Three participants collected data on only three days because of unanticipated problems; the remaining 73 collected four days' practice data. A total of 14,486 primary diagnoses were made; there were no diagnoses for 21 patients.

Also included in the data are from one to five secondary diagnoses for certain patients. These evolved in two ways. The first is when a patient has more than one immediate problem or reason for contacting the physician; the less serious were tabulated as secondary diagnoses. In another instance, the patient may have a prior disease or condition, not involved in the reason for contacting the physician, but having implications in the diagnosis and treatment. An example would be a diabetic patient, contacting the physician with a cardiac problem. The diabetes may be well controlled, and not a factor in the patient's reason for the visit, but it is important in the physician's treatment of the cardiac problem. Therefore it is included in his practice profile. By including these secondary diagnoses, the number on which the practice profiles are based increases to 23,911. The distribution of these is given in Exhibit 11.

Analysis of Individual Practices

On the assumption that the data collection procedure does accurately record each physician's practice, the question then arises as to the similarities and differences between practice profiles of the 76 participants.

In the final analysis, the procedure is equally valid whether or not there are correlations between practices. However, it would be greatly simplified and less costly if correlations were sufficiently high to establish "standard" practice profiles for physicians meeting certain criteria. If one could accomplish the same objectives in personalized planning of continuing education at a lower cost and lesser demand on the physician's time, it would make broad application of the research results much easier.

One of the major theses of the study is that physicians have varying practices and consequently unique educational needs within the context of their personal scientific knowledge in relation to the health care they are called on to deliver. Analysis of the patient data appears to both support and contradict that thesis.

Contradictory Evidence

The major contradiction lies in the fact that five of the 18 ICDA categories appear to predominate in the majority of the practice profiles. These five are, in order of frequency:

18 - Special Conditions & Examinations without Illness
7 - Diseases of the Circulatory System
8 - Diseases of the Respiratory System
16 - Symptoms and Ill-defined Conditions
17 - Fractures, Trauma and Poisoning

In all, these five categories account for 63.14 percent of the 23,911 diagnoses recorded. Next in rank order of volumes of patient contacts are categories with approximately equal numbers:

9 - Diseases of the Digestive System
10 - Diseases of the Genitourinary System
3 - Endocrine, Nutritional & Metabolic Diseases

These three disease categories account for an additional 14.34 percent of total diagnoses, bringing the total of eight categories to 77.48 percent. Next in order are two categories with approximately equal volumes:

6 - Diseases of the Nervous System & Sense Organs
5 - Mental Disorders

These account for 7.12 percent of total diagnoses, bringing the total of the 10 categories to 84.58 percent. Next in order are four categories with approximately equal volumes:

12 - Diseases of the Skin & Subcutaneous Tissue
13 - Diseases of the Musculoskeletal System & Connective Tissue
1 - Infective & Parasitic Diseases
2 - Neoplasms

These four account for 12.19 percent of total diagnoses, beinging the total for 14 categories to 96.77 percent.

With this distribution, one would anticipate certain correlations to occur among the practice profiles of the 76 participants. Some general correlations by ICDA category follow based on rank ordering the 18 major ICDA categories in

each profile and determining the frequency with which rank orders correlate, depending on the number of categories compared.

Table 15

Rank Order Correlations by ICDA Categories

Main Category		Two Categories	
Category	Frequency	Categories	Frequency
18	52	8, 18	24
7	12	7, 18	16
8	5	16, 18	14
16	5	17, 18	11
17	2	7, 16	6
All others*	0	8, 17	2
	76	All others*	3
			76

Three Categories		Four Categories	
Categories	Frequency	Categories	Frequency
7, 16, 18	9	7, 8, 16, 18	8
8, 16, 18	9	8, 16, 17, 18	7
8, 17, 18	8	1, 8, 16, 18	2
7, 17, 18	7	1, 8, 17, 18	2
7, 8, 18	7	2, 7, 16, 18	2
16, 17, 18	4	All others*	55
All others*	32		76
	76		

* (None has a frequency greater than one)

Five Categories

Categories	Frequency
7, 8, 16, 17, 18	23
3, 7, 8, 17, 18	3
3, 7, 8, 16, 18	2
7, 9, 16, 17, 18	2
All others*	46
	76

Six Categories

Categories	Frequency
6, 7, 8, 16, 17, 18	5
7, 8, 10, 16, 17, 18	5
7, 8, 9, 16, 17, 18	3
1, 7, 8, 16, 17, 18	2
2, 7, 8, 16, 17, 18	2
3, 7, 8, 16, 17, 18	2
5, 7, 8, 16, 17, 18	2
12, 7, 8, 16, 17, 18	2
13, 7, 8, 16, 17, 18	2
All others*	51
	76

Seven Categories

Categories	Frequency
3, 7, 8, 10, 16, 17, 18	3
2, 5, 7, 8, 16, 17, 18	2
2, 7, 8, 9, 16, 17, 18	2
3, 5, 7, 8, 16, 17, 18	2
All others*	67
	76

Beyond this point of analysis, all 76 practices become unique; there is no combination of eight categories with a frequency greater than one.

As would be anticipated, there is high correlation when only the major category with the greatest volume of diagnoses in each profile is considered; this is category 18 for 52 of the 76 participants. As one increases the number of ICDA categories which must correlate, the frequency decreases up to the point that five categories are considered. Here 23 of the 76 show a correlation.

Examining additional data available on these 23 physicians' practices reveals that there are common criteria: (1) all are general practitioners, (2) 19 (82.61%)

* (None has a frequency greater than one)

are in solo or small group practice, and (3) 20 (86.96%) practice in communities of less than 10,000 population. More important, 17 of the 23 (73.91%) meet all three criteria.

Therefore, in an analysis on this basis, it would appear that the thesis that all medical practices vary is only partially true; 36.51 of the general practices in the study appear to have a degree of correlation.

Supporting Data

Carrying the analysis one step further, by applying the three criteria above to the remaining 53 participants, one finds 13 general practitioners in solo or small group practice, in communities of less than 10,000 population, whose practice profiles do not fit this pattern. Therefore, while a practice pattern does exist for more than one-third of the general practitioners in the study, there appears to be no way to identify in advance which ones might fit this pattern.

The results are sufficiently promising, however, to warrant further analysis. Since the diagnoses in the practice profile are used to determine test composition, perhaps this is the most valid criterion to use in comparison. To this point correlation has been attempted only in the 18 broad ICDA categories. Since the test is composed at the level of the 975 sub-sub-categories, there must also be correlation at this level.

With this in mind, a more detailed analysis was done of the practices of the eight solo practitioners who met the three criteria previously stated. Four were among the 23 showing a degree of correlation; four were not. An attempt was made to develop a standard profile and devise a standard test for these eight practitioners. Their practices were compared at the level of 975 sub-sub-categories, and the profile constructed to include those diseases and conditions where there were the greatest volumes of diagnoses, and the broadest distribution. While the aim was that each of the eight would have at least one diagnosis in any area where questions were assigned, this was not always possible. By trial and error, it was determined that the best standard profile, covering the greatest amount of the eight practices occurred when 10 of the major ICDA categories were included.

The standard profile which evolves, and assignment of test items, is as follows:

		Number of Questions
Category 3 (Endocrine, Nutritional and Metabolic)		
B-250	Diabetes mellitus	5
B-277	Obesity not of endocrine origin	5
Category 5 (Mental Disorders)		
B-300	Neuroses	5
*B-305	Physical disorders of psychogenic origin	5
Category 7 (Circulatory System)		
C-401	Essential benign hypertension	5
D-412	Chronic ischemic heart disease	5
G-440	Arteriosclerosis	5
Category 8 (Respiratory System)		
*A-463	Acute tonsillitis	5
A-465	Acute upper respiratory infection	5
D-493	Asthma	5
Category 9 (Digestive System)		
*D-551	Hernia of abdominal cavity without obstruction	5
*F-574	Cholelithiasis	5
Category 10 (Genitourinary System)		
B-599	Other diseases of urinary tract	5
*E-627	Menopausal symptoms	5
Category 12 (Skin and Subcutaneous Tissue)		
*A-682	Other cellulitis and abcess	5
*B-692	Other eczema and dermatitis	5
Category 16 (Symptoms and Ill-defined Conditions)		
*A-784	Symptoms referable to upper respiratory tract	5
*A-786	Symptoms referable to genitourinary system	5
*A-787	Symptoms referable to limbs and joints	5

Category 17 (Accidents, Poisonings and Violence)		Number of Questions
*E-845	Sprains and strains of ankle and foot	5
* I-882	Open wound of hand	5
* J-891	Open wound of knee, leg and ankle	5
Category 18 (Conditions and Examinations without Illness)		
A-000	General medical examination	5
C-020	Prophylactic inoculation and vaccination	5
K-105	Surgical aftercare	5
		125

Those diseases and conditions marked (*) in the standard profile indicate occasions where from one to three of the eight physicians would receive test questions when they did not report diagnoses in those areas. A detailed analysis shows that one physician will receive 20 questions not related to diagnoses he reported, three will receive 15 questions, one 10 questions, two five questions, and one will have all questions related to reported diagnoses.

Some arbitrary judgments have been made in devising this standard test. The consultants indicate that if less than five questions are asked on a specific disease or condition, it is difficult to make a judgment on the results. Therefore, this was set as the minimum. It was also made the maximum, so that the examination could cover as many disease categories as possible. A limit of 125 questions was set, since experience indicates it will take two hours for administration, and this is thought to be the maximum feasible for a busy physician.

The following tabulation compares the comprehensiveness of the examination actually administered to the eight physicians with the comprehensiveness of the standard test. The comparison is made at the level of 975 sub-sub-categories; the percentages indicate the number of diagnoses on which questions were asked in the actual test, compared to total diagnoses, and the number of diagnoses on which questions would be asked in the standard test, related to total diagnoses.

Table 16

Percent of Practice Covered by Test

Code Number	Total Profile: Actual Test	Total Profile: Standard Test	10 Major Categories: % of Practice	10 Major Categories: Actual Test	10 Major Categories: Standard Test
Correlated Profiles					
16049	64.1	28.2	83.1	72.2	33.7
21455	54.8	23.8	84.4	60.3	29.2
46540	52.8	25.8	83.1	55.8	32.3
52030	59.3	34.1	73.6	63.5	43.0
Average	57.8	28.0	81.1	63.0	34.6
Non-correlated Profiles					
36151	56.1	29.0	82.4	63.8	39.5
51328	53.9	29.8	81.2	70.2	37.1
62392	53.5	39.2	81.9	63.4	47.0
63053	61.9	26.6	83.3	63.1	32.8
Average	56.4	31.2	81.2	65.1	39.1
Overall Ave.	57.1	29.6	81.2	64.0	36.8

The percentages listed above are lower than those listed for similar comparisons elsewhere in this report, since the criteria are much more stringent; in previous cases correlation was at the level of 18 categories and here it is at the level of the 975 sub-sub-categories.

In any event, use of the patient data in designing a test appears much more effective when practice profiles are considered individually, than when they are correlated to produce a standard test. Four of the eight profiles analyzed are among those that would be expected to be most appropriate for development of a standard profile; four are not. There appears to be little difference among the eight in the results of simulating this.

Consequently, without conducting similar analyses of the other 68 profiles in the study, it appears reasonable to conclude that a great deal of the diagnostic value of the test would be lost in the attempt to simplify the procedure by constructing standard profiles and standard tests.

Additional Observations

Up to this point, only those portions of the data having a direct relationship to the central purposes of the study have been discussed. The physician and patient data also renders some interesting information concerning medical practice which may have application outside the parameters of the study.

For example, the cumulative data confirms previous studies in which it is found that approximately 80% of medical practice is in the office and 20% in the hospital. (The most recent statistics, based on "A Study of General Practice in Massachusetts", by Brown, et. al., in the April 12, 1971 issue of JAMA, gives the figures as 71.6% office, 21.6% hospital, 5.6% home visits, and 1.2% other.)

The data involving general factors in physicians' practices also reveals numerous other interesting items when cross-tabulated with various factors. For example, the volume of patients when compared with the age of the physician:

Table 17

Average Daily Patient Contacts by Physician Age

	26 to 30	31 to 35	36 to 40	41 to 45	46 to 50	51 to 55	56 to 60	61 to 65
Number of Physicians	3	16	17	20	13	3	2	2
Ave. Daily Contacts	22	40	54	55	47	43	55	45

It would appear that the physician entering practice builds his practice volume up to age 45, reaching a maximum workload at age 36-45, and then decreases somewhat and maintains that level until retirement. The only variation in the data occurs for the two physicians between 56-60 years of age who had more patient contacts per day than would be expected.

When a similar tabulation is done for only the General Practitioners in the study, a similar curve results, including the variation in age group 56-60 since both of the physicians involved are General Practitioners.

The statistics dealing with patient volumes by type of practice are not so definitive, when all 76 participants are concerned:

Table 18

Average Daily Patient Contacts by Type of Practice

	Solo	Unispec. -5 Members	Mixed -5 Members	Unispec. 5+ Members	Mixed 5+ Members
No. of Phys.	8	22	4	5	37
Ave. Daily Con.	67	45	39	61	45

However, when similar tabulations are done for only the 63 General Practitioners, a pattern does result:

Table 19

Average Daily Patient Contacts by Type of Practice
(General Practice)

	Solo	Unispec. -5 Members	Mixed -5 Members	Unispec. 5+ Members	Mixed 5+ Members
No. of Phys.	8	22	4	5	24
Ave. Daily Con.	66	45	39	52	30

It would appear that those General Practitioners in solo or large group practice have a greater volume of patient contacts in a day than those in small group practice, and those in group practice with other General Practitioners have slightly higher volumes than those in group practice with specialists. The small physician sample in some categories may affect the validity of these conclusions; it must be confirmed by further data collection with a larger sample.

There are variations when one compares the method or place of patient contact with the medical specialty of the physician, but none are particularly surprising. For example, the one Surgeon profiled has 63% of his practice in the hospital, as compared with an average of 19.3% for all physicians, and a proportional decrease in office contacts. The Internists also show a higher than average use of the hospital, 29.4%, while Pediatricians use the telephone for 26.0% of patient contacts compared with an average of 18.4%.

Concerning age of patients, there are also variations, but none unexpected. Pediatricians have the predominant portion of their practices in the 0-14 age group, while internists and the Surgeon primarily serve a patient population over 40 years of age. General Practitioners serve all age groups.

Testing

Tests were administered to 63 of the 76 participants, as follows:

Table 20

Test Administration
(by number of participants tested)

	Number
General Practice	52
Pediatrics	7
Internal Medicine	3
Surgery	1
Total	63

Tests were sent to the other 13 participants, but had not been returned by the end of the study period.

As previously indicated, the testing procedure proved to be the weakest link in phase 1 of the study. The problems encountered were: (1) limitations in the scope of the test bank, (2) limitations in the structure of the bank, (3) inappropriateness of many test questions to clinical practice, and (4) high cost of testing. In general, these have been resolved in phase 2.

While the number of questions in the new test bank for the second phase is not significantly higher than in phase 1, the quality and distribution evidently was adequate. The clearest indication of this is that the test bank was generally successful in fulfilling the requirements of the test formula; lack of questions either in volume or distribution within the ICDA would have resulted in observable differences between the practice profiles and tests.

Expanding the classification system from the 18 major ICDA categories to the most definitive 975 classifications apparently solved the structural problems. In this way, it is possible to virtually assure a physician that each question in his test will be directly related to one or more diagnoses he has reported. There are some remaining problems related to testing medical specialists; e.g., with a classification system oriented to diseases and conditions it is not possible to test effectively in such areas as anesthesiology, radiology, etc.

The cycling of questions through clinicians apparently solved the problem of inappropriateness. This was determined by asking some participants to review each question asked them and judge whether it was relevant to their practice. In phase 1 this resulted in a 66.7% relevancy rate; in phase 2 this rose to 88.3%.

Cost of the procedure was significantly reduced by eliminating the remote teletype terminal used in phase 1. However, hand preparation of the tests and tabulation of the results involved considerable staff time. Since this is an area that lends itself to automation, hopefully the costs of this procedure could be further reduced by computerization.

Test Formula

While the test formula, previously described, accomplished the major objectives set for it, it was not totally successful. Analysis of practice profiles and the corresponding tests indicates a high level of success in matching test composition to the volume and distribution of patient contacts and diagnoses. However, there appears to be an incompatability between the goals of testing broadly on the practice profile and at the same time providing the physician and consultant with test results in sufficient depth to permit judgments to be made.

The formula is written to provide from one to five questions in any one of the 975 sub-sub-categories; seldom would more than five questions be asked. Experience of the consultants is that the present maximum of five should probably be the minimum; they find it difficult to make judgments on less. However, if the length of the test is to remain constant at 125 questions, taking approximately two hours, this would limit testing to a maximum of 25 of the 975 sub-sub-categories in the ICDA.

The following table presents the impact of the attempt to obtain broad coverage of the profile on the testing results. The first column indicates the percentage of diagnoses covered by the entire test, and the second column the percentage of diagnoses covered when those major categories in which less than 10 questions were asked are eliminated:

Table 21

Coverage of Practice Profile by Test
(by per cent)

	Percentage Covered by Total Test	Percentage Covered by In-depth Testing
General Practice	90.4	66.0
Pediatrics	83.0	68.0
Internal Medicine	96.3	67.8
Surgery	92.0	80.0
Total	91.3	66.6

Other Problems in Test Administration

Another problem area involves idiosyncracies in the classification system. Category 16, "Symptoms and Ill-defined Conditions," accounted for a substantial number of diagnoses and consequently had a major influence on test composition. While it was possible to test in this category, the results were of limited use to the participants and consultants. It has only 17 sub-sub-categories, and some, such as 16-B-791 "Headache," are useful. However, most merely refer back to one of the other 17 major categories, e.g., 16-A-783," Symptoms Referable to respiratory system." The solution may be to change coding procedures so that all diagnoses in category 16 are related to the other categories and used as contributing data to any educational determinations in that way.

A second idiosyncracy in the classification system involves category 17, "Accidents, Poisonings, and Violence." This single category has 187 of the 975 sub-sub-category listings in the ICDA; it is much more definitive than any of the other 17 major categories. The result is that the total number of diagnoses in category 17 may be high, but the number in any one sub-sub-category is likely to be quite low. The test formula was written to attempt to provide for this problem, but examination of the data indicates that it was only partially successful; less testing was done in category 17 than was indicated by total volume of diagnoses. Even when testing was done, the classification was too specific to lend itself to educational consultation, e.g., one classification, 17-I-882, deals with "Open wound of hand except finger(s)," and another, 17-I-883 deals with "Open wound of finger(s)." A combining of sub-sub-categories may solve the problem for the future.

A further possible improvement in the testing procedure involves "weighting" of diseases and conditions so that those that are more life-threatening, or likely to result in disability, play a greater role in test composition than others. Experiments are now being carried out to determine the feasibility of this.

Finally, the new testing procedure of using written tests has resulted in an administrative problem. In phase 1, with an interactive test administered on-line with the computer, the participant had to set aside a specific time period in which to complete his test. The written test takes its place among other priorities in his busy schedule. This has resulted in the late return of tests (an inconvenience and delay in the process) and non-return of tests in 13 instances, which makes continuation of the educational planning procedure impossible. If this is a problem with selected, highly-motivated participants, it may become a serious handicap when dealing with a general physician population.

Test Scores

There is little value or validity in considering cumulative test scores; each test was of different composition so comparison on a meaningful basis is difficult. Consequently, the discussion of cumulative scores will be limited.

One requirement was that the individual questions, and the consequent test, be sufficiently "difficult" to provide the necessary discrimination on which to base decisions. A test on which most of the questions are answered right, or most wrong, would not meet the requirements of the study. Ranges of the test scores for the physicians tested were:

Table 22

Ranges of Test Scores
(by number of participants)

	Per cent Correct				
	Less Than 50%	50% to 59%	60% to 69%	70% to 79%	More Than 80%
Number of Participants	2	5	23	23	10

In the judgment of the project staff most of the tests did fall into a range where there was sufficient discrimination on which to base recommendations and decisions. Where tests did not render useful data it usually involved a physician

who scored in excess of 80% correct; the few incorrect answers did not present a basis for judgment.

Test Analysis

It is important to note that for the purposes of this study, the physician is in competition with himself on the test, not with other physicians. Therefore, it is not important that the total test scores do not lend themselves to accepted forms of statistical analysis. Each physician's total test score is used as a base, with which scores in specific segments of the test are compared, e.g., if his score in "Respiratory Disease" is a significant number of percentage points below his total score, it is an area which warrants further investigation.

The procedure for test analysis which evolved during the second study phase is as follows:

1. Test results in each of the 18 categories are compared with the total score and with each other to determine if general areas can be identified for more detailed analysis; this is essentially a screening procedure.
2. Once the major category or categories have been identified, examination is made of each of the sub-sub-categories included in that major category. This provides information on whether those questions answered incorrectly are generally distributed throughout the category, or related to specific diseases or conditions.
3. Finally, if the above steps appear to identify probable or possible areas for study, the individual questions asked on the test give further information, particularly those answered incorrectly.

This would lead to the analysis of one physician's test results as follows (total score was 71.2%):

Table 23

Report of Test Results-#24093

Category	No. of Diagnoses	% of Practice	No. of Questions	Number Right	Number Wrong	Per cent Right
18	70	35.2%	27	16	11	59.3%
17	22	10.2%	16	11	5	68.8%
8	19	8.8%	17	9	8	53.9%
7	16	7.9%	15	13	2	86.6%
16	13	6.0%	16	14	2	87.5%
1	12	5.5%	3	2	1	66.7%
10	10	4.6%	7	6	1	85.7%
6	9	4.0%	4	4	0	100.0%
12	9	4.0%	4	2	2	50.0%
3	8	3.7%	8	6	2	75.0%
2	6	2.7%	0			
5	5	2.3%	3	3	0	100.0%
9	5	2.3%	0			
11	5	2.3%	4	2	2	50.0%
13	3	1.3%	0			
14	2	0.9%	0			
4	1	0.5%	0			
15	0	0.0%	0			

The first observation that can be made is that there was testing in reasonable depth in five of the 18 major categories. It is of interest to note that the computer, following the test composition formula, had proceeded through all 18 categories and assigned test questions in any sub-sub-category where there were three or more diagnoses; it had completed the same procedure and assigned questions in all sub-sub-categories where there were two diagnoses. Since the number of questions still did not reach the limit of 125, it began to repeat the process for those sub-sub-categories with only one diagnoses and had proceeded through categories 18, 17, 8, 7 and 16 before it reached the limit.

The second observation is that in view of the participant's total score of 71.2%, there are two categories where further analysis is warranted: category 18 with a score of 59.3% and category 8 with a score of 53.9%. The other three

categories in which a significant volume of testing took place have scores at or significantly above the total score.

Detailed analysis of category 18 reveals the following:

Table 24

Category 18 Test Results - #24093

Sub-sub-Category	Disease or Condition	Total Questions	No. Right	No. Wrong	% Right
18-A-005	Well baby examination	5	3	2	60%
G-060	Pre-natal care	5	3	2	60%
H-070	Post-partum care	5	3	2	60%
C-020	Inoculation & vaccination	5	3	2	60%
A-000	General examination	4	2	2	50%
J-090	Contraception	3	2	1	60%

It would appear the physician is equally prepared over the entire category, but scores less well than in other areas of medicine. Consequently, he and the consultant will examine the 27 questions asked, with particular attention to the 11 he answered incorrectly, as one step in making the educational diagnosis.

Another physician with a similar profile and a slightly lower total test score, had the following results in the same category:

Table 25

Category 18 Test Results - #26044

Sub-sub-Category	Disease or Condition	Total Questions	No. Right	No. Wrong	% Right
18-A-000	General examination	5	4	1	80%
G-060	Pre-natal care	5	1	4	20%
A-005	Well baby examination	5	3	2	60%
A-009	Unspecified examinations	1	1	0	100%
A-002	Radiologic examination	2	2	0	100%

In this instance it is doubtful the physician requires study in the entire category; the discussion between the consultant and participant would center on "Pre-natal care," and perhaps "Well-baby examination." While this may appear a bit

detailed, and based on a small amount of data, it should be pointed out that the physician reported 10 patient contacts for "Pre-natal care" during the four days data were collected, an average of 2.5 per day. If this is an accurate reflection of his practice, and he sees patients on 240 days in a year, it indicates 600 patient contacts in this sub-sub-category annually.

Analysis of test data also included examination of results in those major categories where few questions were asked. An example of this is presented by category 3 where there were seldom enough diagnoses to warrant a high volume of questions. However, when testing did occur, it was usually in the sub-sub-categories involving "Diabetes" and "Obesity." There were frequent occasions when four or five questions were asked in either of these two sub-sub-categories and few answered correctly. These at least represented areas warranting discussion even though few questions were asked. In the final analysis, the only difference between a result of answering two questions correctly out of five and eight correctly out of 20 is in the degree of confidence one has in the result; both indicate 40% success.

It should be pointed out that the above procedure evolved during phase 2, and was not used throughout the study. In the majority of the test analyses, test results were given in the 54 categories in which the Educational Resource Index is classified, on the rationale that this would permit direct transfer of test data to that index for selection of educational events or materials. The result was that it was extremely difficult for the consultant and physician to get an overview by major category, since the data were presented in a fragmented manner. This will be discussed in detail later, since it had an effect on usefulness of test data in the consultation process.

Diagnostic Use of Test Results

The procedure described above was applied to test results of the 63 physicians tested, for the purposes of this report, even though it was not used on all of them in carrying out the study. This was done because it gives a more realistic measurement of the role of testing in the total process than was actually achieved.

This procedure would give the consultant one of the following results: (1) identify probable areas for study, (2) identify possible areas for study, (3) identify no areas.

In the first instance, this might involve entire categories where a significant volume of questions were asked and the scores in those categories were substantially below his total score, or it might involve specific sub-sub-categories where few questions were asked but all, or almost all, were answered incorrectly.

Probable areas of study involved those in categories where the total score was only slightly below the total test score, or individual sub-sub-categories revealed two or three questions out of five answered incorrectly.

Criteria for making these judgments varied from one test to the next since each judgment had to be made relative to the individual's performance on other test segments rather than against a standard.

The third possibility was that the test results revealed no area of potential study. This occurred most often with those who achieved high total scores, and consequently had few incorrect answers on which to base determinations. It also occurred with some physicians who had medium or lower level scores, but scored equally well across the entire profile.

The results of the 63 participants tested are as follows:

Table 26

Indications for Study Based on Testing
(by numbers of participants)

	Indicated Probable Study Area(s)	Indicated Possible Study Area(s)	Indicated No Area of Study
General Practice	20	26	6
Specialty Practice	1	7	3
Total	21	33	9

In those instances where test results indicated both probable and possible areas of study, the physician is listed under "probable" since this is considered the most valuable result.

As indicated in the above table, 88.5% of the general practitioners and 72.7% of the specialists received some indication of educational need from the test results. There is a difference in the degree of indication. For general practitioners, 38.5% received probable indications and 50.0% possible indications. However, for specialists only 9.1% received probable indication of educational

need and 63.6% received possible indications. The testing procedure was significantly less definitive for them.

Volumes of Potential Study Areas Identified

Another measurement of the value of the test data is in the volume of information provided to each participant tested.

Table 27

Probable Areas of Study Identified

	Entire Categories	Ave.	Sub-sub-Categories	Ave.	Total	Ave.
General Practice	18	0.3	30	0.6	48	0.9
Specialty Practice	1	0.1	0	0.0	1	0.1
Total	19	0.3	30	0.5	49	0.8

As indicated, 49 areas of probable study including total categories or specific sub-sub-categories, were identified for the 63 physicians, an average of 0.8 areas per physician. The range is from zero to six. Considering only general practitioners, the average is 0.9, with the same range. For specialists the identification of probable areas of study was almost totally unsuccessful.

Table 28

Possible Areas of Study Identified

	Entire Categories	Ave.	Sub-sub-Categories	Ave.	Total	Ave.
General Practice	30	0.6	134	2.6	164	3.1
Specialty Practice	4	0.4	34	3.1	38	3.5
Total	34	0.5	168	2.7	202	3.2

With 202 possible areas of study identified for the 63 participants, the average is 3.2, with a range of zero to nine.

Considering the data in both tables 27 and 28, it would appear that the testing mechanism identified both probable and possible areas of study for general practitioners in reasonable volumes and at both the category and sub-sub-category level, with emphasis on the latter. For specialists, the volume of probable areas of study was virtually zero, and the most guidance was in possible areas of study at the sub-sub-category level.

Specific Areas of Study Identified

Accepting the limited sample of physicians involved, and the variance in test composition and analysis, some general observations can be made concerning the specific areas of study indicated by the testing procedure.

Combining the data in tables 27 and 28, one gets the following results:

Table 29

Probable and Possible Areas of Study Identified

	Entire Categories	Sub-sub-Categories	Total
General Practice	48	164	212
Specialty Practice	5	34	39
Total	53	198	251

Distribution of these 251 areas within the 18 major categories of the ICDA is as follows:

Table 30

Distribution of Areas of Study Identified

	General Practice		Specialty Practice		Total	
ICDA Category	Entire Cat.	Sub-sub-Cat.	Entire Cat.	Sub-sub-Cat.	Entire Cat.	Sub-sub-Cat.
1				2		2
2	4	2			4	2
3	2	22	1	1	3	23
4				1		1
5	1	7		2	1	9
6	1	1	1	1	2	2
7	12	35		3	12	38
8	9	24		2	9	26
9	2	7	1	1	3	8
10		8		1		9
11						
12	1	4	1	2	2	6
13	1	4			1	4
14				1		1
15				2		2
16	1	2			1	2
17	3	9		2	3	11
18	11	39	1	13	12	52
	48	164	5	34	53	198

A comparison of the areas of potential study identified by testing for the 52 general practitioners with the volumes of diagnoses reported in the 18 ICDA categories renders interesting results:

Table 31

Comparison of Volumes of Diagnoses and Potential Study Areas Identified by Testing (52 General Practitioners)

Rank Order by ICDA Category

Rank Order	Category By Volumes of Diagnoses	Category By Volumes of Potential Study Areas
Most Frequent	18	18
	8	7
	7	8
	16	3
	17	17
	10	9
	3	5
	9	10
	5	2
	6	12
	12	13
	13	16
	2	6
	1	1
	4	4
	11	11
Least Frequent	14	14
	15	15

A similar comparison for specialists is unproductive, since only category 18 has a significant volume and the other 17 categories were identified as potential study areas from zero to three times each.

Table 31 indicates that the greatest variations occur with category 2 which rises four levels in the rank order, category 3 which rises three levels, and categories 5 and 9 which rise two levels, as well as category 16 which drops eight levels, category 6 which drops three and category 10 which drops 2. In general, the correlation between volume of diagnoses and volume of identified study areas is quite close.

A more detailed analysis, by category and sub-sub-category of the 32 general practitioners of the areas of potential study as indicated by testing is:

Table 32

Areas of Study Identified by Testing

ICDA Category	Subject Area	Number
18	Special Conditions and Examinations	11
A-000	General medical examination	7
A-002	Radiological examination	2
A-003	Laboratory examination	1
A-004	Well baby and child care	7
C-020	Inoculation and vaccination	2
G-060	Prenatal care	6
H-070	Postpartum observation	2
J-090	Contraception and sterilization	2
K-100	Medical aftercare	2
K-105	Surgical aftercare	3
Total		47
7	Diseases of the Circulatory System	12
A-390	Rheumatic fever	2
C-401	Benign hypertension	13
D-410-14	Ischemic heart disease	6
E-420-29	Other forms of heart disease	7
F-430-38	Cerebral vascular disease	2
G-440-58	Circulatory system	5
Total		47
8	Diseases of the Respiratory System	9
A-462	Acute pharyngitis	2
A-465	Acute upper respiratory infection	3
A-466	Acute bronchitis	2
C-480	Viral pneumonia	1
C-486	Pneumonia, unspecified	5
D-490	Bronchitis, unspecified	6
D-491	Chronic bronchitis	1
D-493	Asthma	2
E-507	Hay fever	2
Total		33
3	Endocrine, Nutritional and Metabolic	2
A-240	Endocrine	1
B-250	Diabetes mellitus	13
D-277	Obesity	9
Total		25
17	Accidents, Poisoning and Violence	3
A-800-29	Fractures	1
E-840-48	Sprains and strains	3
Q-960-79	Adverse drug effects	4
S-990-99	Other adverse effects	1
		12

ICDA Category	Subject Area	Number
9	Diseases of the Digestive System	1
B-530-37	Esophagus, stomach and duedenum	3
F-570-77	Liver, gallbladder and pancreas	5
Total		9
5	Mental Disorders	1
B-300	Neuroses	6
B-303	Alcoholism	1
Total		8
10	Diseases of the Genitourinary System	
A-580	Acute nephritis	1
B-599	Diseases of urinary tract	2
E-625	Diseases of the uterus	2
E-626	Disorders of menstruation	3
Total		8
2	Neoplasms	4
A-F	Malignant neoplasms	1
H-221	Benign neoplasms of female genital organs	1
Total		6
12	Diseases of the Skin and Subcutaneous Tissue	1
B-692	Eczema and dermatitis	3
C-708	Urticaria	1
Total		5
13	Diseases of Musculetal System & Conn. Tissue	1
A-712	Rheumatoid arthritis	2
A-715	Arthritis, unspecified	1
B-720	Osteomyelitis	1
Total		5
16	Symptoms and Ill-defined Conditions	1
A-784	Symptoms referable to upper gastroint. tract	1
B-791	Headache	1
Total		3
6	Diseases of the Nervous System & Sense Organs	1
E-G	Diseases of the eye and ear	1
Total		2

There were no testing indications for study in categories 1, 4, 11, 14 and 15.

If testing, in itself, is accepted as a method of identifying educational needs, the above listing would be of value in planning continuing education programs and production of continuing education materials.

Indications for programming would be:

Special Conditions and examinations without illness, with emphasis on general medical examinations, well baby and child care, and prenatal care.

Diseases of the circulatory system, with emphasis on hypertension.

Diseases of the respiratory system, with emphasis on bronchitis and pneumonia.

Diabetes and obesity.

Neuroses.

For the purposes of this study, however, the test results were utilized as only one factor, albeit a major one, in the consultation process.

Educational Consultation

During phase 1 of the study a variety of faculty members served as educational consultants to the 37 participants. While they demonstrated a high degree of interest and involvement, there were two major handicaps which decreased their effectiveness: (1) unfamiliarity with private clinical practice, and (2) unfamiliarity with educational resources available. For these reasons, it was determined that in phase 2, consultants would be limited to a small number who had a background of private practice and were completely familiar with the processes and administrative procedures of the study.

Three educational consultants, all faculty members, were involved in phase 2. The majority of the consultation was done by a specialist in Internal Medicine with 14 years' experience in private practice before joining the faculty. He was assisted by a General Practitioner and a Pediatrician with 10 and two years experience in private practice, respectively.

Consultation Procedure

The consultation procedure was a flexible one, within a general format, which varied according to the value of the objective data available, the personality and experience of the consultant, and the personality and background of the participant.

When the participant had completed the testing, the consultant would be furnished with the objective data concerning the physician, his practice setting, his practice profile, and the test results. After review of these, he would visit the participant, usually in his office setting. While the actual consultation was flexible, it followed a general pattern:

1. The consultant would review the data regarding the physician and his practice setting with the participant and determine if he could leave his practice for continuing education, and if so how long and how often.
2. They would then jointly review the patient data and cross tabulations of it.
3. Next came a discussion of the practice profile, based on a bar-graph presentation of diagnoses in the 18 categories of the ICDA.

4. Then they would jointly examine the test results, with discussion centered at the sub-sub-category level and in the areas with the greatest volumes of patient contacts, based primarily on those questions answered incorrectly. This included review of specific questions.

5. The consultant would then ask the questions listed on the consultant's report (Exhibit 7).

6. He would then demonstrate the Educational Resource Index so that the participant would be able to effectively utilize those portions eventually sent to him.

During this entire process, which generally took about two hours, the consultant would take detailed notes on the participant's comments and observations. It was found that if these were taken as direct quotations they were most useful for future determinations.

Upon return to the central office, the consultant would then review all of the information and data and direct the staff in preparation of a final report to the physician. This would include:

1. A summary of physician data and general patient data.

2. The practice profile.

3. Suggestions on implementation of a recommended continuing education program.

4. Appropriate sections of the Educational Resource Index.

5. A personalized letter summarizing the results of the consultation.

Consultations Completed

Of the 76 participants, 63 completed the testing phase and 58 of these were consulted as follows:

Table 33

Educational Consultation Completed
(by number of participants)

Specialty	Number
General Practice	51
Pediatrics	5
Internal Medicine	1
Surgery	1
Total	58

Analysis of Consultation

As one examines the process of educational consultation as it evolved in the second study phase, it appears there were four major factors that contributed to a greater or lesser degree to the design of individual educational programs.

Two of these were based on objective data: (1) Practice profile (number of diagnoses by ICDA categories), and (2) Test results.

Two were based on subjective information: (1) Interpretation of test results by the interaction of the consultant and participant. (This differs from the objective analysis above in that the perceptions of the participant and subsequent insights by the consultant added significantly to the simple statistical analysis.), and (2) Interaction between the consultant and participant concerning the physician's practice situation, perception of educational needs, and personal characteristics.

By examining each of the four factors in relation to the final educational program suggested, it is possible to make judgments on which factors apparently contributed to the end result.

In the analysis, the various elements are:

Factor A: Practice profile. If the category or sub-sub-category designated as an area for study correlates with a significant number of diagnoses in the practice profile, it is assumed for purposes of the tabulation that the profile was a significant factor in the selection. In certain instances the educational prescription is too general to relate to the profile; in others it is in an area where few or no diagnoses were recorded.

Factor B: Test Results. Statistical analysis, with some judgmental decisions as described previously in this report, was used retrospectively to identify categories and sub-sub-categories in which the testing indicated probable or possible areas of study. These were correlated with the designated areas of study, and when there was correlation it was assumed that the test data did play a role in educational diagnosis. In some instances education was recommended in areas where no testing occurred, and in rare instances there were educational recommendations contrary to the test results.

Factor C: Interaction on Test Results. When the test results were used to motivate discussion between the participant and consultant, the results were sufficiently substantial and subjective to constitute a major input to the final educational diagnosis. For this reason, this interaction is considered separately from Factor 2, above. These results were recorded by the consultant and when they correlated with the educational diagnosis it was assumed they played a major role in design of the educational program.

Factor D: Interaction on Practice Characteristics. This represents discussion by the consultant and participant on a variety of subjects, e.g., the physician's perceived needs in continuing education, problems he encounters in his practice, his likes and dislikes, for example. Decisions based on these factors were tabulated in the consultant's report, and when these correlated with the educational program recommended, they were assumed to have played a major role in its composition.

Process Analysis

A total of 170 specific educational recommendations were made to the 58 physicians who completed the consultation procedure. This ranged from one to six recommendations per physician, with an average of 2.93. Each educational recommendation made may have been the result of from one to all four of the factors previously listed; the distribution is as follows:

Table 34

Number of Factors Contributing to Educational Diagnoses

	Volume of Factors Involved			
	1	2	3	4
General Practice	49	48	50	10
Specialty Practice	6	3	1	3
Total	55	51	51	13

Under ideal circumstances an educational diagnosis would be the result of all four factors previously defined; this occurred only 13 times out of 170 (7.6%). Decisions based on three, two, or one factors occurred with about equal frequency (approximately 30% each). The general contribution of each of the four factors can be tabulated as follows:

Table 35

Contribution of Factors to Educational Diagnoses
(by per cent)

	Specific Factors*			
	A	B	C	D
General Practice	68.6	45.8	48.4	51.6
Specialty Practice	52.9	35.3	52.9	52.9
Total	67.1	44.7	48.8	51.7

*Factor A - Practice Profile
Factor B - Test Results
Factor C - Interaction Based on Test Results
Factor D - Interaction Based on Practice Characteristics

Based on this correlation, it would appear that the practice profile (volumes of diagnoses made in ICDA categories) had the greatest influence on educational diagnosis for general practitioners with the contribution of the other three factors being approximately equal. For specialists the statistical analysis of test results was least useful, with the other three factors being equal.

Inter-relationships of Factors

Having identified the relative roles of the four factors in arriving at recommended educational programs, it is worthwhile to determine in greater detail the specific roles and inter-relationships of them in the consultation process.

When the educational diagnosis was based on single or multiple factors, the distribution among the four factors identified was:

Table 36

Recommendations Based on One Factor

	Specific Factors*				
	A	B	C	D	Total
General Practice	3	1	3	42	49
Specialty Practice	1	1	1	3	6
Total	4	2	4	45	55

Table 37

Recommendations Based on Two Factors

	Specific Factors*						
	A & B	A & C	A & D	B & C	B & D	C & D	Total
General Practice	8	16	19	2	1	2	48
Specialty Practice	0	3	0	0	0	0	3
Total	8	19	19	2	1	2	51

Table 38

Recommendations Based on Three Factors

	Specific Factors*				
	A-B-C	A-B-D	A-C-D	B-C-D	Total
General Practice	42	7	1	0	50
Specialty Practice	1	0	0	0	1
Total	43	7	1	0	51

Relative Value of Educational Diagnoses

The prior analysis of the number of factors involved in a single educational diagnosis, and their inter-relationships, permits judgments to be made as to the value of each diagnosis.

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*Factor A - Practice Profile
Factor B - Test Results
Factor C - Interaction Based on Test Results
Factor D - Interaction Based on Practice Characteristics

Ideal Result - The 13 situations in which all four factors evidently had a role in the educational diagnosis are considered the best possible result in terms of the research objectives.

Effective Result - The 51 instances where three of the four factors were involved also appear to effectively meet the research objectives. In the majority of these instances the two objective factors were combined with the subjective conclusions of the consultant and participant, based on test results. In all but one of the remainder the objective data were combined with interaction concerning the physician's practice characteristics. Only in one instance was the diagnosis based primarily on subjective data.

Moderately Effective Result - It is somewhat difficult to place a value judgment on the 51 educational prescriptions based on two of the four factors. As indicated in Table 37, the majority of these included the practice profile as one of the factors, so at least any prescribed area of study did relate to diseases and conditions which the physician was called on frequently to treat. The other factor involved was usually subjective, based on interaction between the consultant and physician.

Ineffective Result - Of particular concern are the 55 instances where the educational prescription was based on only one of the four factors. As indicated in Table 36, this factor was usually interaction by the consultant and participant over his practice characteristics.

Further analysis indicates that some of these indicate possible areas of weakness in the process; others are relatively unimportant.

The first is a group of 25 diagnoses made for physicians who already had a planned educational program in one or more areas of study based on results classified above as ideal, effective, or moderately effective. The diagnoses based on only one factor were in addition to the acceptable educational plan, and consequently are not of great concern.

Another group of 22 can be traced to tests which did not give clear indications of potential areas of study. Consequently, the only factors available to the consultant and physician were the practice profile and interaction based on practice characteristics. Usually one or more educational diagnoses were made on the two factors, and those based on a single factor were supplementary.

Finally, there were eight educational diagnoses where the data proved of little value in identifying educational needs, and the consultant and participant had no option but to rely on only one factor.

In summary, by placing value judgments on the 170 educational diagnoses made, one arrives at the following:

Table 39

Value of Educational Diagnoses

Value		Number
Ideal Result		13
Effective Educational Diagnosis		51
Moderately Effective Diagnosis		51
Ineffective Educational Diagnosis		
Supplementary to Effective Diagnoses	25	
Due to High Test Scores	22	
Due to Unknown Reasons	8	
Total		55
Total		170

With nearly one-third of the diagnoses based on only a single factor, and consequently considered ineffective in terms of program planning, similar value judgments can be made by examining their distribution among the 58 physicians involved.

For this purpose, it is considered effective program planning if the participant has one or more educational diagnoses based on three factors, moderately effective if this is reduced to two factors, and ineffective if there was no educational diagnosis based on more than one factor. A tabulation on this basis gives the following results:

Table 40

Value of Educational Programs

Value	Number
Effective Educational Program Planning	35
Moderately Effective Program Planning	18
Ineffective Program Planning	5
Total	58

In summary, as a result of the process, it was possible to design acceptable educational programs for 53 of the 58 participants. The remaining five may be indicative of a failure of the process, or may identify physicians who have effective continuing education programs and consequently do not have detectable areas of weakness.

Problems and Preferences in Practice

As indicated, there were a number of instances in educational diagnosis when the data gave little or no guidance, and decisions were based on practice characteristics, including the likes and dislikes of participants.

It is of interest to note that of the 58 participants consulted, 26 listed one form or another of mental disorders as the problem which caused them most distress. Seven listed obstetrical complications as the major problem area and four listed geriatrics.

On the positive side, 17 listed obstetrics as the most enjoyable part of medical practice; 12 listed surgery and 10 listed pediatrics.

Time as a Barrier to Continuing Education

Recognizing time, in relation to patient demands and responsibilities, as a possible barrier to implementation of a continuing education program, the consultants attempted to determine how free physicians were to leave their practices for short periods of study.

Forty-eight physicians responded to this inquiry, and gave the responses on the following page. (Table 41)

This ability to leave the demands of practice for a week or more by 40 of the 48 physicians who responded to the question undoubtedly reflects on the large number in group practice in the sample. It did give the consultant and participant a good deal of flexibility in the design of educational programs since virtually any of the entries in the educational resource index could be accomplished in the times indicated.

Table 41

Ability to Leave Practice for Education

Number of Days	Number of Physicians	Number of Times Per Year
21	1	2
21	1	3
14	13	1
14	10	2
14	3	3-4
14	1	5
10	1	1-2
7	2	1
7	5	2
7	2	4-5
7	1	6
3	2	1
3	3	2
3	1	3
3	1	4
3	1	Unknown

Preferred Method of Study

It is an accepted fact in the field of education that individuals learn best in specific ways, or a combination of ways. With this in mind, the consultant posed the question to participants as to the way in which they thought they learned best. Of the 52 participants who responded to the question, 50 indicated that they did know how they learned best; the results are as follows:

Table 42

Preferred Method of Learning
(by number of participants)

	Method of Learning						
	Audio	Video	By Doing	Audio/ Video	Audio/ Doing	Video/ Doing	Other
General Practice	8	9	18	1	3	1	5
Pediatrics	0	0	2	0	1	0	1
Internal Medicine	1	0	0	0	0	0	0
Total	9	9	20	1	4	1	6

If a physician was unable to specify his preferred or most effective method of study, the consultant attempted to assist him in making such a determination. Recall of experience in the first two years of medical school, when much knowledge was transferred by audio or visual methods, as opposed to the final two year when emphasis was by observing and doing, often helped in such a decision.

The information was of use in designing educational programs, since those who thought they learned best by audio methods could select conferences or tape/recorded home study programs, while those who learned best visually might concentrate on texts and journals. For those who learned by doing, the best approach might be to arrange apprenticeships.

Educational Resource Index

The ability to leave practice for short periods of study, and the method in which each participant thought he would learn best gave the consultant and physicians indications of the form in which their demands should be made on the educational resource index. The entire index was much to cumbersome and complex to use on an individual basis, and each physician was provided only with those portions which applied directly to his planned educational program.

Once the above determinations were made, and requests made for sections of the index, it is of interest to note how successful the resource was in meeting these demands on it.

Tabulation indicates that 123 sections were sent to the 58 participants in response to the 170 educational diagnoses made, or 72.4 per cent success in fulfilling requests. Of the 47 instances where no listing was sent, 15 involved staff errors and four involved instances where specific apprenticeships were arranged at the time of consultation and no selection was necessary. However, in 28 instances the index was unable to respond. In 15 of these, the prescription was too general (e.g., geriatrics, sports medicine) and not in the classification system. In 13 instances it involved techniques or procedures (e.g., venipuncture in infants, obtaining and interpreting arterial blood gasses) which were difficult if not impossible to retrieve from the index. Consequently the index was unable to respond in 16.5 per cent of the instances; in another 11.2 per cent the index could have fulfilled the request, but was not called on because of staff error or other arrangements making it unnecessary.

Practice Management

While the entire procedure, and objectives of the study, relate to the scientific practice of medicine, data collected and insights of the consultants led to the conclusion that there were elements of practice organization and management involved which had major implications for the quantity and quality of health care delivered. Of the 58 participants consulted, the major recommendations made were:

1. Management of incoming telephone calls

Establish written protocol	29
Improve present methods	4
	33

2. Delegation of responsibility to ancillary personnel

Establish protocol for specific tasks	25
Make changes in present protocol	7
	32

Evaluation

Throughout this report an attempt has been made to pass judgment on the success or failure of each procedure involved, and explore other options of accomplishing the same task better or more efficiently. This continuing process analysis constitutes one form of evaluation, and a summary of the results is as follows:

Data Collection

1. Both methods of data collection rendered the desired data.
2. Use of dictating machines proved more economical, and consequently is the method of choice.
3. The procedure cannot be eliminated by having participants predict their practice profiles.
4. The procedure cannot be eliminated by devising standard profiles.

Testing

1. There is an unresolved conflict between the goals of testing broadly on the practice profile, and to sufficient depth for educational diagnosis. At present the procedure is more successful in breadth of testing, and less successful in depth of testing.
2. The classification system needs refinement for testing purposes.
3. Testing carried out was relevant to clinical practice.
4. Testing generally provided the required discrimination for General Practitioners, but was less successful for Specialists.
5. Testing did assist generally in identification of educational needs, but usually failed to provide conclusive evidence.
6. It is not possible to design meaningful standardized tests.
7. It is possible to make only limited judgments on common educational needs of a physician population on the basis of cumulative test results.

Consultation

1. Staff physicians fully familiar with the process appear better able to provide educational consultation than faculty subject area specialists.

2. While all factors in the process appear to contribute to the educational diagnosis, the practice profile appeared to be the most useful.

3. The consultation procedure, based on both objective and subjective information, appeared effective in designing educational programs.

4. The educational resource index was generally successful in providing specific educational events or materials to meet identified educational needs.

Judgments of Participants

In order to determine participants' attitudes toward the procedure, the 36 physicians who completed the consultation process were surveyed; 34 returned the questionnaires (Exhibit 9). They were asked to evaluate both the procedures involved, and the results achieved.

Concerning process analysis, comparisons can be made between the judgments of the staff and those of the physicians. The data are as follows:

Table 43

Value of Procedures to Participants
(by per cent)

	Practice Profile	Testing	Consultation
Staff Analysis	67.1	66.7	56.0
Participant Survey	65.6	58.9	67.6
Difference	- 1.7	-16.1	+ 7.6

The figures for staff analysis were obtained from Table 35, an assessment of the contribution of the various factors to determination of the educational diagnosis. The figures for the participants' evaluation were obtained from the survey form, where they rated each procedure on a scale of 1 to 5, with a rating of 1 regarded as 100% and a rating of 5 as 0%.

The value judgments placed on the practice profile and consultation procedure are quite comparable; the participants obviously placed a higher value on the testing procedure than did the staff analysis.

Participants were also asked in the survey to rate the entire process. This can also be compared with staff ratings based on the data presented in Table 40.

Table 44

Value of Process to Participants
(by per cent)

	Very Helpful	Helpful	Not Helpful
Staff Analysis	60.3	31.0	8.6
Participant Survey	20.6	58.8	20.6
Difference	-39.7	+27.8	+12.0

The staff analysis represents the percentage of the 58 participants whose educational programs were deemed "effective", "moderately effective", or "ineffective" planning as a result of the entire process. The figures for the participants' evaluation were obtained from the survey form where physicians rated the value of the entire program on a scale of 1 to 9, with ratings of 1-3 indicating degrees of "very helpful", 4-6 indicating "helpful", and 7-9 "not helpful". As in the previous table, a rating of 1 was considered 100% helpful and a rating of 9 was considered 0% helpful. In spite of the differences in semantics, and the ways in which the numerical ratings were derived, the results are considered validly comparable.

As is obvious, in spite of the support expressed for the separate procedures by the participants as presented in Table 43, the staff was generally more satisfied with the end result than were the physicians.

Re-testing

As previously stated in this report, six of the original 37 participants were re-tested at the conclusion of Phase I of the study. The five who carried out educational programs showed statistically significant improvement in test scores; the one physician who did not carry out his educational program showed a decrease. Due to the low number tested, the results were not considered significant, particularly due to inadequacies detected in the test bank.

It was the intent of the staff to conduct similar re-testing at the conclusion of Phase 2. This was not done for two reasons: (1) time did not permit a significant number of participants to complete their educational programs, and (2) in the judgment of the staff, test results had come to be regarded as less than conclusive evidence of the success or failure of the process.

To expand on the staff attitude toward testing, experience during Phase 2 has led to a concensus that the degree of testing conducted does not render conclusive evidence. Much in the same manner that a physician uses diagnostic procedures to arrive at a diagnosis and regime of therapy, the test results are of most value when considered in relation to other available data. If this analagy holds, then the degree of success or failure of the Individual Physician Profile process is best measured in the improvement in quality of patient care.

Research in health care delivery is just beginning to provide the methodology to make such a determination. Peer review, in a hospital setting, as demonstrated by Clement R. Brown, M.D., at Chestnut Hill Hospital, Philadelphia, Pennsylvannia; Robert L. Evans, M.D., at York Hospital, York, Pennsylvannia; and Beverly C. Payne, M.D., for the Michigan State Medical Society and Hawaii Medical Association, appears to offer one promising method. The staff is now exploring ways that this methodology could be applied to a physician's total practice, and as a consequence be used as an evaluation mechanism for the process.

CONCLUSIONS

The sole objective of the research was to develop a process by which an individual physician could identify and meet his personal educational needs, in relation to the health care he is called on to deliver.

The intent was to define a physician's practice for him, test his instant recall of scientific knowledge in relation to that practice, provide a mechanism for interpretation of this objective data in the context of subjective information he provides, and provide specific information on which to base a continuing education plan.

As such, it does have limitations. The practice data must be considered in its proper context: (1) it is a sampling and does not take into account seasonal changes in practice which may exist, and (2) it is dependent on accurate preliminary diagnosis. The testing data also have limitations: (1) most of the questions deal with instant recall, and do not deal with synthesis and application of the information involved, and (2) much of the testing is insufficient in depth to provide more than general guidance. The consulting procedure departs from an objective approach, and introduces intuitive judgments which may or may not be correct. Also, while the educational plan is provided, there is no assurance that it is in fact carried out.

Finally, and perhaps most important, while the process does reflect on quality of patient care, it does not make an objective measurement of this.

With these qualifications, the process can be considered in its proper context, and conclusions drawn:

General Conclusions

1. While there are similarities among individual physicians' practices, they do vary substantially in terms of identifying individual educational needs.

From the cumulative data nearly two-thirds of the diagnoses are in five ICDA categories, and generalizations can be made on this basis. However, there are variations when the specific diseases and conditions within these five categories are considered. When the remaining one-third of practice, involving the other 13 ICDA categories, is considered the variations in practice profiles become even greater.

In the context of this research, which is based on the health care which the physician is called on to deliver, the significance of these variations in practice profile are considered sufficiently important to require definitive identification.

2. It is possible to identify individual educational needs for family practitioners.

In phase 2 of the study, in the judgment of the project staff, design of educational programs was successful for 91.4% of the physicians who completed the consultation phase. The figure for general practitioners is 92.2% and for specialists 85.7%.

However, the degree of indication given was much higher for the general practitioners, e.g. an educational diagnosis was more likely to be based on multiple factors rather than just one factor involved in the process.

Consequently, while there is confidence that a general practitioner participating in the program is likely to receive valuable guidance in planning his continuing education program, the data indicate that a specialist is less likely to gain guidance of comparable value.

3. It will be possible to identify individual educational needs for medical specialists.

There appear to be two weaknesses in the present process which lead to limitations in identifying educational needs of specialists. The first involves the fact that the present test bank does not provide the discrimination required to identify potential areas of study. The second is that it does not lend itself to testing in medical areas, e.g. surgery, where techniques and procedures are an important factor. This second limitation, while primarily a reflection on the test bank, also involves problems in the classification of patient data.

However, there is confidence that these weaknesses can be overcome, and that the basic process is applicable to all medical specialties.

4. Individual educational needs do vary.

There is great variation in the educational programs proposed for the physicians who completed the entire process, and it would appear that only limited reliance can be placed on any general needs identified. For example, Category 7, "Diseases of the Circulatory System" is most frequently prescribed as an area for study, and this is supported by the patient data, test results, and

determinations made by the participant and consultant. It is a proposed area of study for 62.1 per cent of the 58 physicians who completed the process. Consequently, there is some basis for general educational programming in this area. However, the next most common area of educational need, Category 5, "Mental Disorders", ranks midway in the list of volumes of diagnoses and test results, but high in the priorities established by the consultant and participant. It is a prescribed area of study for 37.9 per cent of the 58 physicians. Thus identification of common educational needs is limited, and becomes substantially less useful as each additional category is considered. Equally, while it may be possible to generalize that a certain percentage of physicians have educational needs in a specific area of medicine, it still leaves the problem of identifying those physicians who do and eliminating those who do not.

5. It is possible to design personal educational programs for individual physicians, based on the health care they are called on to deliver.

Staff analysis indicated that educational programs were successfully designed for 91.4 per cent of those who completed the process; survey of participants indicated that 85.3 per cent considered the entire process helpful or very helpful.

The role of the educational resource index was an important one in this design. Staff analysis indicates that use of the index or arrangement for a specific apprenticeship was possible in 83.5 per cent of the instances. Survey of the participants indicates they found the index useful 82.4 per cent of the time.

Observations

The study also revealed or confirmed certain information related to medical practice:

1. Telephone communication between the physician and patient plays an important role in the practice of medicine.

In the first study phase, 29.1 per cent of patient contacts were by telephone in the second study phase the figure was 18.4 per cent. Utilizing either figure, the conclusion is that the telephone is an important factor in medical practice.

It is surmised that some of the decrease between the two study phases is due to loss of data, but there is documentation that a substantial portion results from changes in telephone management within the office setting.

A standard part of the consultation procedure at the end of phase two was the provision of a telephone answering protocol. The data indicate a potential area of study concerning the role of telephone communications in medical practice, with particular attention to utilization of health manpower.

2. Home visits are becoming an inconsequential factor in the medical practices studied.

Home visits accounted for only 1.0 per cent of the patient contacts in phase two of the study. In a similar study in Massachusetts, they still constituted 5.6 per cent of medical practice. The results in this study may reflect a regional situation related to Wisconsin, or perhaps only to the sample in the study.

This may be an area of further study also, with attention to the types of diseases and conditions involved in house calls, and the influence of such factors as travel and implications on such matters as utilization of health manpower.

3. Patient contacts frequently involve multiple diagnoses.

With 14,507 patient contacts and 23,911 diagnoses recorded during phase two of the study there was an average of 1.65 diagnoses per patient. Secondary diagnoses ranged from one to six.

Further analysis of these data is warranted, to make judgments on implications as to the diagnostic process and training in diagnosis.

4. Volumes of patient contacts appear to vary by such factors as age of physician, type of practice, etc.

On the limited data available, it appears that the volume of patient contacts follows general patterns when the age of the physician, whether he is in solo, small group, or large group practice, and other factors are considered.

Certain of this data warrants further study, with attention to practice efficiency and utilization of health manpower.

5. Time does not appear to be a barrier to carrying out continuing education programs.

Of 48 participants surveyed, 83.3 per cent indicated they could leave their practices for a week or more at a time to carry out continuing education programs.

Since time is one of the factors most often listed as a barrier to continuing education, this observation warrants further investigation. The preponderance of group practitioners in this study probably had a major effect on the results.

6. Physicians apparently know the methods by which they learn best.

A corallary to designing a continuing education program involves efficient and effective utilization of the time devoted to carrying out that program. Some individuals learn best in one method of study, others by another, some by multiple methods.

Sometimes the educational task dictates the preferred educational method, e.g. learning a technique or procedure may be best done by doing, rather than reading or listening about it. Where there is an option, the physician's individual characteristics should be taken into account. Experience in the consultation process indicates that physicians can identify the methods by which they learn best; further study might be valuable to confirm these intuitive conclusions.

7. Procedures in the management of medical practice vary greatly.

An important factor in a physician's efficiency is the way in which a physician manages his practice. The consultation process indicates that this varies greatly among the participants. A factor which causes one physician great difficulty may be handled very efficiently by another. While an effort was made to discover and communicate effective practice management procedures during the study, there appears to be little effort to do this in a substantial way.

Since there are major implications for effective utilization of health care personnel, the entire area of practice management appears to warrant study.

Analysis of Procedures

On the assumption that the results of the research appear to warrant: (1) expansion of the program to include substantial numbers of general practitioners in Wisconsin, (2) adoption by others in continuing medical education, and (3) continued improvement in the process and expansion to include other medical specialties, some conclusions related to the process are warranted.

1. The resources developed appear adequate, but further effort is either required or desirable to accomplish the above. Some changes in the classification system are required to make the present procedure more effective. This includes

resolving the problems caused by categories 16 and 17, as previously explained. It also includes broadening the classification system to provide for the basic sciences and techniques and procedures.

The test bank is now considered adequate for testing general practitioners, and it has particular strength in its relation to clinical practice. It is considered desirable to expand the volume and distribution of questions in the bank, and the conflict between the desire to test broadly on the practice profile but in significant depth in particular areas must be resolved. The advisability of weighting diagnoses so that those which are life threatening, or likely to result in disability, become more important in test composition must also be resolved. A challenge exists in developing the test bank to include the various intellectual processes involved in medical decision making. At present the test bank primarily relates to instant recall of factual information. It is also possible to test in interpretation, application, analysis and synthesis. The development of the bank to cover these additional intellectual processes would be a substantial task.

There are still some problems with the computer programs developed for the project. These include changes to make the programs more responsive to needs of the Wisconsin project, and documentation to permit them to be easily adapted to the needs and equipment capabilities of others interested in initiating similar projects based on the resources presently developed.

2. Cost of the process, as with most research and development, has been substantial. Because of the large amount of staff time and data manipulation, the on-going costs are also substantial. There is continued research and development, as outlined above, as well as maintenance of the resources such as the test bank and educational resource index. In addition to these, the base cost of performing the process for one physician has been documented to average $215.90. Some economies already appear possible. By eliminating the two visits to the physician, that of the project specialist to explain data collection and that of the consultant, the average individual cost is reduced to approximately $125. Both functions will be attempted by telephone. Other possible economies will be explored, but there is danger in reducing effort and cost to the point that the process is significantly less valuable to the physician; a balance must be achieved where the costs appear to equal the value received by the participant with consequent self-support.

3. While the achievement of the research objective related to development and refinement of a process appear sufficiently conclusive for expansion of the concept, the evaluation is not yet considered adequate. Expansion, it is thought, can be justified on the basis that the process fills an existing void. Evaluation by participant reaction, staff analysis, and limited re-testing is not considered conclusive.

The aim of the project staff is to attempt to evaluate the process in terms of improved patient care. While the details are not worked out, it would involve utilization review based on both office and hospital patient records, and a comparison between delivery of health care prior to and following completion of the educational program developed by the process.

Long-Range Implications

As indicated in this report, the process developed and data collected open up significant avenues of additional research, much of it unrelated to continuing medical education.

The data gathering procedure, even with its limitations and poor sampling techniques, appears to have provided information not available elsewhere. With improved techniques it may render data critical to major decisions being made in the health care field today.

Physicians can and will be tested on scientific knowledge. The present test bank may have limitations, but it appears to be unique in its relation to clinical practice. If the additional evaluation previously suggested establishes a relationship between test results and quality of delivery of health care, the implications would be substantial.

The subjective information gained through the consultation process has resulted in some insights into the clinical practice of medicine not previously available to the faculty.

All of these provide a potential starting point which could have major implications on the continum of education in the health sciences. For physicians, this education is now fragmented into medical school, internship and residence, and continuing education. The process developed in this study, with further development, may provide the means by which data from clinical practice can be related back to the medical school curriculum and formal postgraduate training

period to identify strong points, weak points, and changes in clinical practice which should be immediately provided for by changes in curricula. Equally, there is a potential for information as to what types and numbers of allied health personnel should be trained to fulfill the needs of clinical practice.

Exhibit I

QUESTION EVALUATION SHEET

Question number _____

Feel free to write anywhere on these pages

Reviewed by _____

PART I: STRUCTURAL AND MEDICAL VALIDITY

	O.K.	NOT O.K.	IF NOT O.K., WHY?
1. Question Statement:	_____	_____	
2. Question Alternatives:	_____	_____	
3. Correct Answer:	_____	_____	

PART II: RELEVANCY TO CLINICAL SITUATIONS

4. In your judgement, this question is most relevant to the following type or types of practice. (Please circle)

G.P. Surgery

Int. Med. Others _____

Pediatrics _____

5. The information presented in this question pertains to .....

a) _____ common clinical situations and " on the spot" decisions

b) _____ decisions requiring commonly available diagnostic tools and procedures

c) _____ problems or techniques requiring special knowledge or training

6. The extent to which this item is characteristic of situations and problems faced by clinicians is:

0	1	2	3	4	5
NOT characteristic					very characteristic

7. COMMENTS AND SUGGESTIONS:

Exhibit 3

[redacted]

Date: _____ Question Number: _____

Reviewed by: _____

		Circle one	
A.	Is the answer to the question scientifically correct?	Yes	No
	If Yes, is it the best possible alternative?	Yes	No
	If No, why not?		
B.	Are the other options reasonable?	Yes	No
	If No, which ones are not and why not?		
C.	Do you consider any part or parts of the question statement to be scientifically or factually erroneous?	Yes	No
	If Yes, please mark the part or parts		

Exhibit 3

PHYSICIANS DEPOSITION

1. Name [illegible]
2. Specialty Peds Second Specialty _____
3. Office Address _____
4. Office Phone _____
5. Second Office Address _____
6. Second Office Phone _____
7. Home Address _____
8. Home Phone _____
9. Office Contact C.A.B. Position AA appointment desk
10. Physician's Age 34
11. Total years in practice 9
12. Years in present location 5
13. Size of Medical Community (6) 16 m.d.'s
14. Size of city (8) 8.7m
15. Office situation (2) Grp.
16. Type of Practice (5) 11 m.d.'s - multi specialty
17. Ancillary Workers -
MD's 2 part time Other supporting personnel 18
18. Days off Thursday afternoon
19. Total hours per week working 49-50
night emergency - 0 hrs/wk
other emergency 5-10 hrs/wk

Medical Education

1. Medical School [illegible] Where [illegible]
2. Internship [illegible] Where [illegible]
3. Residency [illegible] Where [illegible]

What Specialty

Where Where

Other Specialty

4. Board Eligible
5. Board Certification
6. Society Memberships [illegible]

Hospital Affiliations

1. Primary hospital affiliation [illegible]

Where

How far from office [illegible]

2. Other hospital affiliations [illegible]

Where

How far from office

3. Number of beds in primary hospital
4. Practice privileges in primary hospital:

Medical	Complete		Limited
Surgical	Complete		Limited
OB	Complete		Limited
Other	Complete		Limited

PHYSICIAN DATA

DAILY RECORD

LY RECORD FORM

1 Specialty
2-4 Physician No.
5-6 Age
10-11 Years in Practice
12 Medical Ed.
14 Size of Medical Community
15 Type of Practice
16 Size of Patient Community
17 Type of Community
18 Postgraduate Training
19
20

	SIGNIFICANT SIGNS & SYMPTOMS	MAJOR DIAGNOSIS	CONTRIBUTING DIAGNOSES	TESTS ORDERED	TREATMENT & DISPOSITION

Exhibit 5

Physician 22998 Test 1

Which lice plays occurs in the oral cavity if it is often confused with:
a. Carcinoma.
b. Leukoplakia.
c. Tuberculosis.
d. Gingivitis.
e. Fordyce's disease.

Select one of the following statements concerning the relationship of infectious mononucleosis is correct:
a. Penicillin is contraindicated because of the increased frequency of hypersensitization in this disease.
b. All cases of mononucleosis-specific pharynx should also be considered complicating this disease must be in order use of the specific antibiotic.
c. Immune serum globulin is known to decrease the duration of the illness.
d. Tetracycline is apt to increase the chances of developing hepatitis.
e. Antibiotics have not noticeably limited the duration of the disease.

What most level of urinary output is the condition defined as oliguria:
a. No urinary output
b. Less than 10 ml daily
c. Less than 200 ml daily
d. Less than 300 ml daily
e. Less than 400 ml daily

Answers on my blank. Use the principles & practice of medicine.
Appleton-Century-Crofts, 17th Edition, 1960. P.159

Antineoplastic drug not specific as the initial therapy in all but which one of the following diseases:
a. Lymph nodes
b. Leukemia
c. Retinoblastoma
d. Glomerulonephritis
e. Hemangioblastoma

Answers, Tumor Dis. principles of internal medicine, 6th Ed. pp. 600

PHYSICIAN 22592 TEST 1

A 54-YEAR-OLD CAUCASIAN GIRL HAS HAD ATTACKS OF EPIGASTRIC PAIN FOR ONE YEAR. HER PARENTS ARE VERY ANXIOUS, AND RECENTLY THE PAIN HAS MADE IT NECESSARY FOR HER TO ALTERNATE FROM SCHOOL. CAREFUL AND REPEATED DIAGNOSTIC STUDIES HAVE REVEALED NO ORGANIC DISEASE. NO GROSS PSYCHOPATHOLOGY IS APPARENT IN THE PATIENT OR OTHER FAMILY MEMBERS. THE NEXT STEP SHOULD PROBABLY BE:

A. INTENSIVE DRUG THERAPY USING AN ANTISPASMODIC AND A TRANQUILIZER
B. PSYCHOANALYSIS FOR THE PATIENT, IF HER PARENTS CAN AFFORD IT
C. EXPLORATORY LAPAROTOMY
D. STRICT RULES FOR MANAGING EACH ATTACK WHICH MINIMIZE APPEAL AND PARENTAL PARTICIPATION - PLUS IMMEDIATE RETURN TO SCHOOL
E. PSYCHOTHERAPY INVOLVING THE ENTIRE FAMILY GROUP FOR A PROLONGED PERIOD

ANTIPSYCHOTIC ANTIBIOTICS ARE TO PROTEIN VALUE [6]:
A. MEASLES [MORBILLI]
B. RESPIRATORY DISEASE
C. RHEUMATIC FEVER
D. GLOMERULONEPHRITIS

[illegible] PRINCIPLES OF INTERNAL MEDICINE, 6TH ED.,
MC GRAW-HILL: NEW, P. 1487

A FAMILY TYPICAL PATTERN OF CONCENTRATIONS OF ELECTROLYTES IN A PATIENT WITH RESPIRATORY ACIDOSIS [5]:

	Na	K	Cl	TOTAL CO2	PH
A.	117 MEQ/L	3.0 MEQ/L	80 MEQ/L	50MM/L	7.50
B.	127 MEQ/L	3.0 MEQ/L	90 MEQ/L	40MM/L	7.40
C.	137 MEQ/L	4.5 MEQ/L	95 MEQ/L	45MM/L	7.35
D.	142 MEQ/L	4.8 MEQ/L	98 MEQ/L	25MM/L	7.31
E.	142 MEQ/L	5.0 MEQ/L	110 MEQ/L	15MM/L	7.22

A FINAL COMMONLY UNDERSTATED CAUSE OF HOSPITAL ACQUIRED INFECTIONS [6]:
A. LACERATIONS OF THE MUCOCUTANEOUS AREAS
B. LACERATIONS OF THE RESPIRATORY AREAS
C. CONTRACTIONS OF THE CIRCULATION OF A FIRST CAST
D. CONTRACTIONS OF THE MUSCLE SURROUNDING THE FRACTURED BONE

9. A 45 YEAR OLD TRUCK DRIVER WAS IN AN ACCIDENT AND SUSTAINED A SEVERE LACERATION OF THE LEG. HE WAS TAKEN TO A NEARBY EMERGENCY ROOM WHERE THE WOUND WAS CLEANED AND SUTURED . THE PATIENT RECEIVED TETANUS ANTISERUM INTRAVENOUSLY. TWO WEEKS LATER, THE PATIENT BEGAN TO DEVELOP PAIN IN THE RIGHT SHOULDER. THE PAIN EXTENDED TO HIS HAND. TWO DAYS LATER (18 DAYS FOLLOWING THE ACCIDENT) HE DEVELOPED A SIMILAR THOUGH LESS SENSITIVE AREA ON THE BACK OF HIS RIGHT HAND. THREE DAYS LATER (19 DAYS FOLLOWING THE ACCIDENT) THE PATIENT BEGAN TO NOTICE WEAKNESS IN ELEVATION OF HIS RIGHT ARM AND WEAKNESS OF GRIP IN THE RIGHT HAND. WHICH OF THE FOLLOWING IS THE MOST LIKELY DIAGNOSIS?
A. AMYOTROPHIC LATERAL SCLEROSIS
B. POST-INFECTION POLYNEURITIS
C. SERUM NEURITIS
D. CONVERSION REACTION(HYSTERIA)

10. WHICH ONE OF THE FOLLOWING STATEMENTS ABOUT DISSEMINATED HISTOPLASMOSIS IS CORRECT?
A. BLOOD CULTURES ARE POSITIVE IN LESS THAN 50 OF ALL PATIENTS.
B. THE ADRENALS ARE ALMOST INVARIABLY UNINVOLVED.
C. PLEURAL EFFUSION IS EXTREMELY COMMON.
D. CHEST INVOLVEMENT IS PRESENT IN NEARLY 90 OF ALL PATIENTS.

11. ALL OF THE FOLLOWING ARE COMMON SIGNS OF CARDIAC FAILURE IN INFANTS EXCEPT:
A. CARDIOMEGALY.
B. TACHYCARDIA.
C. HEPATOMEGALY.
D. PULMONARY RALES.
E. RESPIRATORY DISTRESS.

12. A CHILD FOUND TO HAVE HYPERGAMMAGLOBULINEMIA AND LYMPHOPENIA DEVELOPS MARKED LYMPHOPENIA. WHICH OF THE FOLLOWING IS THE MOST LIKELY DIAGNOSIS
A. BRUTON TYPE AGAMMAGLOBULINEMIA
B. VARIANT OF THYMIC APLASIA
C. WISKOTT-ALDRICH SYNDROME
D. INTESTINAL LYMPHANGIECTASIA
E. ACUTE LYMPHATIC LEUKEMIA

LEFT SIDE OF ANSWER SHEET

RIGHT SIDE OF ANSWER SHEET

SENT TO M.D. AFTER PAINTING

Answer Sheet
Physician 22552 Test 1

Question No.	Acc. No.	Cat. No.	Level	Ans.
1	4710	056528	2	B
2	4739	018075	1	E
3	2959	168786	1	E
4	1020	178999	0	E
5	3369	168784	1	D
6	2995	058665	0	C
7	4733	18a003	1	C
8	2828	178013	2	C
9	2997	17.091	0	C
10	4040	166783	2	E
11	4358	166788	1	D
12	0170	0a4.089	2	D
13	3107	166787	0	A
14	4463	178989	0	D
15	3743	178873	0	D
16	1807	12a4.02	0	D
17	2898	178405	2	C
18	3873	178816	1	D
19	3952	08a.05	1	C
20	4420	08a462	1	D
21	4093	166798	2	D
22	3702	18a196	1	D
23	3168	178913	1	C
24	4361	318371	1	C
25	3343	18a316	1	C
26	4259	166799	2	D
27	1926	178132	0	D

Quest	A	B	C	D	E	F
1	B	D	D	D	B	B
2	E	E	E	E	E	E
3	E	E	E	E	E	E
4	E	E	E	E	E	E
5	D	D	D	D	D	D
6	C	C	C	C	C	C
7	C	C	C	C	C	C
8	C	C	C	C	C	C
9	C	C	C	C	C	C
10	E	E	E	E	E	E
11	D	D	D	D	D	D
12	D	D	D	D	D	D
13	A	A	A	A	A	A
14	D	D	D	D	D	D
15	D	D	D	D	D	D
16	D	D	D	D	D	D
17	C	C	C	C	C	C
18	D	D	D	D	D	D
19	C	C	C	C	C	C
20	D	D	D	D	D	D
21	D	D	D	D	D	D
22	D	D	D	D	D	D
23	C	C	C	C	C	C
24	C	C	C	C	C	C
25	C	C	C	C	C	C
26	D	D	D	D	D	D
27	D	D	D	D	D	D

Categories	# of Diagnosis	13	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		036		049																								
		038		049																								
		039		049																								
		045

Exhibit 7

RESULTS OF CONSULTATION

I EXAM SUGGESTS NEED IN:

a)

b)

c)

d)

II YOU SUGGESTED NEED IN:

a)

b)

c)

d)

III PRACTICE PROBLEMS CAUSING DISTRESS:

a)

b)

c)

IV PATIENT PROBLEMS CAUSING DISTRESS:

a)

b)

c)

V FUN PART OF PRACTICE:

a)

b)

c)

d)

IMPLEMENTATION OF YOUR CONTINUING EDUCATION

I EDUCATIONAL SUGGESTIONS:

A Scientific

1.
2.
3.
4.
5.

II YOU LEARN BEST BY:

Audio _____
Visual _____
By doing _____
Other _____

III YOU CAN LEAVE YOUR PRACTICE:

_____ days at a time
_____ times a year

[illegible] IN PRACTICE

I MANAGEMENT OF INCOMING TELEPHONE CALLS:

A.
B.
C.

II DELEGATION OF RESPONSIBILITY TO AUXILIARY HELP

A.
B.
C.

III EDUCATION OF CLIENTELE

A. Pamphlets _____
B. Films _____
C. Slides _____
D. By auxiliary help _____
E. Other _____

IV PERSONAL [illegible] BUSINESS

1. Beck, L.: "Medical Secretary, Medical Office and Patient Care", [illegible] Basic Business Education Series, Cleveland, Ohio [illegible]

2. Glenn, J.E. and Green, B.D.: "Practice - Advanced Practice": Modern Medical Secretary, Chicago, Illinois, Publishers [illegible] Inc.

INDIVIDUAL PHYSICIAN PROFILE
I.P.P.
IDENTIFYING PATIENT PROBLEMS

TABLE OF CONTENTS

1. Characteristics of Practice
2. Summary of exam Results
3. Results of Consultation
4. Implementation of Continuing Education
5. Innovations in Practice
6. Educational Resource Index (E.R.I.)
7. Key to Resource Index
8. Continuing Medical Education Suggestions
9. Medical Library Request Form
10. Added Materials

#22552

CHARACTERISTICS OF PRACTICE - 1970 - 4days
September 4, 8, 16, 21

I Total patient contacts for 4 days 145

II Type of patient contact

office	av. 21 pts/day
telephone	av. 10 pts/day
hospital	av. 3 pts/day
house calls	av. _____ pts/day
emergency	1+ pts/day

III Character of practice

Male 52.3 %

Female 47.6 %

IV Age Range

	Office	Hospital
Under 14	76.3 %	64 %
Under 40	98 %	92 %
40-65	_____ %	_____ %
65 & older	_____ %	_____ %

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TEST RESULTS

1. Percentage of practice covered by test: 83%
2. Total number of questions in test: 125
3. Number correct: 97
4. Number wrong: 28
5. Percentage correct: 77.6%
6. Total number of diagnoses: 250

Results by Category:

Cat. #	# of Dx.	% of Pract.	Total Items	# Correct	# Wrong	% Correct
18	66	26.4%	24	17	7	70.8%
17	42	16.8	17	15	2	88.0%
16	24	9.6	26	18	8	69.0%
8	18	7.2	9	8	1	88.8%
9	16	6.4	7	7	0	100.0%
1	13	5.2	9	9	0	100.0%
12	10	4.0	6	2	4	33.0%
6	9	3.6	2	0	2	0%
4	8	3.2	3	2	1	67.0%
15	7	2.8	4	2	2	50.0%
5	5	2.0	4	3	1	75.0%
10	5	2.0	5	5	0	100.0%
7	2	.8%	1	1	0	100.0%
11	0		1	1	0	100.0%

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Results by Sub-Sub Category

Cat. Number	Sub-sub Category	# of Diagnoses	% of Practice	Total Items	# Correct	# Wrong	% Correct
18	B010 Immun & Sensitivity	28		6	4	2	67
	A003 Lab. Exam	7		5	3	2	60
	C020 Innoc & Vacc.	5		5	3	2	60
	A005 Well Baby	21		5	4	1	80
	1030-39 1100-30 Postop	5		3	3	0	100
17	873 Laceration Head	2		1	1	0	100
	884 Mult. " Upper Limb	0		1	1	0	100
	907 Mult. " Unspec.	0		1	1	0	100
	810 Fx. Clavicle	2		1	1	0	100
	813 Fx. Radius & Ulna	2		5	4	1	80
	816 Fx. Phalanges Hand	4		1	1	0	100
	807 Fx. Ribs, sternum & Larynx	0		1	1	0	100
	815 Fx. Metacarpal Bones	0		1	0	1	0
	960-39 Adverse Drug Effects	5		4	4	0	100
	930 Foreign Body Eye	1		1	1	0	100
16	780 Sx. C.N.S. & Spec. Senses	1		2	1	1	50
	782 Sx. Cardu. & Lymphatic	1		2	2	0	100
	783 Sx. Resp. System	3		3	2	1	67
	784 Sx. Upper GI	2		2	2	0	100
	785 Sx. Abdomen & Lower GI	3		3	3	0	100
	786 Sx. GU System	2		2	1	1	50
	787 Sx Limbs & Joints	3		3	3	0	100
	788 Gen. Sx.	8		6	2	4	33
	789 Abnorm. Urin. Constit.	1		3	2	1	67
8	465 URI	3		3	3	0	100
	486 Pneumonia, Unspec.	1		3	2	1	67
	461 Sinusitis	0		1	1	0	100
	480 Uiral Pneumonia	0		1	1	0	100
	490-93 Bronch, Emph, Asthma	1		1	1	0	100
9	540-69 Dis Intestine & Peritoneum	8		1	1	0	100
	520-29 Dis. oral Cavity, Sal. gl. Jaws	5		2	2	0	100
	530-37 Dis. Esoph, Stom, Duodinum	2		3	3	0	100
	570-77 Dis. Liver, Galbl., Pancreas	1		1	1	0	100

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Cat. Number	Sub-sub Category	# of Diagnoses	% of Practice	Total Items	# Correct	# Wrong	% Correct
	009 Diarrheal Dis	4		2	2	0	100
	034 Strept Throat	2		1	1	0	100
	075 Infect. Mono	3		3	3	0	100
1	079 Other Viral Dis	2		1	1	0	100
	017 TB other organs	0		1	1	0	100
	032 Diphtheria	0		1	1	0	100
	692 Other Exzema & Dermatitis	4		3	1	2	33
	708 Urtichria	1		1	0	1	0
12	691 Infantile Exzema & Relat.	0		1	0	1	0
	709 Other Dia. Skin	0		1	1	0	100
6	320-58 Dis Nervous Sys.	1		2	0	2	0
4	Dis. Bld & Bld. forming Org.	8		3	2	1	67
15	Perinatal Morbid & Mortality	7		4	2	2	50
	ental Disorders	5		4	3	1	75
10	580-99 Dis.Urinary System	5		5	5	0	100
7	390-98 Rheum. Fever & Heart Disease	0		1	1	0	100
11	Compl. Preg & Puerperium	0		1	1	0	100

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RESULTS OF CONSULTATION

I EXAM SUGGESTS NEED IN:

a) Other examinations without Illness
b) Diseases of Skin and Subcutaneous Tissue
c) Symptoms and ill-defined conditions
d) Fractures, Dislocations, Sprains and Strains

II YOU SUGGESTED NEEDS IN:

a)
b)
c)
d)

III PRACTICE PROBLEMS CAUSING DISTRESS:

a) Phones
b)
c)

IV PATIENT PROBLEMS CAUSING DISTRESS:

a) Neurological and Emotional
b)
c)

V FUN PART OF PRACTICE:

a) Newborn
b) Well baby
c) Cardiology
d)

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INNOVATIONS IN PRACTICE

I MANAGEMENT OF INCOMING TELEPHONE CALLS:

A. Keep tally of reasons for calls.
B. Procedure guide for calls could be set up.
C.

II DELEGATION OF RESPONSIBILITY TO ANCILLARY HELP

A. Take inventory of tasks performed to see what can be
B. delegated - Set up a procedure guide to avoid legal entanglement
C.

III EDUCATION OF CLINETELE

A. Brochures X
B. Films X
C. Slides _____
D. By ancillary help X
E. Other _____

IV PROBLEM ORIENTED RECORDS

1. Weed, L.: "Medical Records, Medical Education and Patient Care", 1969 Press of Case Western Reserve University, Cleveland, Ohio 44106
2. Bjorn, J.C. and Cross, H.D.: "Problem - oriented Practice": Modern Hospital Press, Chicago, Illinois, McGraw-Hill Publications Co.

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IMPLEMENTATION OF YOUR CONTINUING EDUCATION

I EDUCATIONAL SUGGESTIONS:

A Scientific

1. General well-baby and Child Care annual conferences
2. General annual meetings for Internal Medicine
3.
4.
5.

II YOU LEARN BEST BY:

Audio _____
Visual _____
By doing __X__
Other _____

III YOU CAN LEAVE YOUR PRACTICE:

__14__ days at a time
__1__ times a year

THE EDUCATIONAL RESOURCE INDEX

The Educational Resource Index is a compilation of educational opportunities available to the practicing physician. Information is included on:

A. Away
   1. Conferences
   2. Post-graduate Traineeships (or apprenticeships)

B. Home
   1. Audiovisual Material (tapes, slides, films)
   2. Programmed Instruction (and home study courses)
   3. Medical Texts and Journals

The pertinent information on the above offerings is coded into one or more of the appropriate Disease Categories listed on the enclosed request form.

The included computer print-out covers the categories of the Resource Index which have been suggested to you by your educational consultant. The blue dot marked programs have been specifically recommended for your needs or are felt to be particularly outstanding by the consultant. If you feel that you would want additional categories of information please fill out and return the Educational Resource Index Request Form. Check the boxes that conform to the type of instruction and Disease Categories desired.

KEY TO EDUCATIONAL RESOURCE INDEX

	POST GRAD.	AUDIO-	PROGRAMMED MED. TEXTS
	CONF. TRAINEE.	VISUAL INST.	& JOURNALS
ENTRY DATE:	Beginning date	Date produced or published	
DELETE DATE:	Ending date of program	---------Not Meaningful-------	

99/99/99 = DATES UNKNOWN

88/88/88 = DATES TO BE ARRANGED

KEY TO ABBREVIATIONS

FOR: G - General Practioners
S - Specialists
B - Both

METHODS:
AV - Audiovisual Aids
BR - Bedside Rounds
Clin C - Clinical Conf.
LC - Live Clinic
Lab - Laboratory Work
Lec - Lecture
O - Open Question Periods
OP - Enrollee Observes Procedure
PD - Patient Demonstration
Pan - Panel Discussion
PP - Enrollee Performs Procedure
Sem - Seminar
R - Radio or Telephone
Surg - Operative Human Surgery
TV - Television
PI - Programmed Instruction

KEY TO ADDRESSES

Albany Dept. of PG Medicine Tapes, 47 New Scotland Avenue
Albany, New York 12208
Audio-Digest Tape Foundation, 1250 South Glendale Avenue
Glendale, California 91205
Wisconsin Dial Access Tapes, In Madison: 262-4515, Other areas: 1-800-362-8174
Wisconsin Single Concept Films
Wisconsin Telephone/Radio Conferences, 614 Walnut Avenue
Madison, Wisconsin 53706

,18-3 WELL BABY AND CHILD CARE
•GET,DOCTOR,WELL BABY AND CHILD CARE
DOCTOR
WELL BABY AND CHILD CARE
AWAY
CONFERENCES

11234 ENTRY DATE 04/12/71 DELETE DATE 04/16/71
PEDIATRIC ENDOCRINOLOGY, GROWTH, & METABOLISM
SPONSOR- JOHNS HOPKINS UNIV SCH OF MED, 601 N BROADWAY,
BALTIMORE, MARYLAND 21205
LOCATION- SAME ADDRESS
FOR- B, LIMIT 120
FEE- $175
LENGTH- 5 DAYS, 35 HRS,
METHODS- AV, CLIN C, OP, LEC, LC, D, PAN, PD, SEM

11717 ENTRY DATE 04/12/71 DELETE DATE 04/17/71
SPECIALTY REVIEW COURSE IN PEDICATRICS
SPONSOR- COOK COUNTY GRADUATE SCHOOL OF MEDICINE
707 S. WOOD ST., CHICAGO, ILL. 60612
FOR- PED.
LENGTH- 5 1/2 DAYS

10977 ENTRY DATE 04/15/71 DELETE DATE 04/15/71
12TH ANNUAL MATERNAL & CHILD HEALTH INSTITUTE
SPONSOR- PENNSYLVANIA MED SOCIETY
BYPASS & ERFORD RD., LEMOYNE, PENNSYLVANIA 17043
LOCATION- HERSHEY MOTOR LODGE
W. CHOCOLATE AVE., HERSHEY, PENNSYLVANIA 17033
FOR- B, LIMIT 200
FEE- $10
LENGTH- 1 DAY, 4 HRS
METHODS- AV, LEC, D, PAN

11226 ENTRY DATE 04/19/71 DELETE DATE 04/24/71
SPECIALTY REVIEW COURSE IN PEDIATRICS
SPONSOR- COOK COUNTY GRAD SCH OF MED,
707 S WOOD ST, CHICAGO, ILLINOIS 60612
LOCATION- SAME ADDRESS
FOR- S, LIMIT 85
FEE- $150
LENGTH- 5 1/2 DAYS, 38 HRS.
METHODS- AV, LEC, D
COMMENTS- INFORMATION & APPLICATION FORM AVAILABLE

11274 ENTRY DATE 04/22/71 DELETE DATE 04/24/71
PARANATAL RADIOLOGY
SPONSOR- UNIV OF WIS, 307 N CHARTER ST, MADISON, WIS 53706
LOCATION- WIS CNTR, 702 LANGDON ST, MADISON 53706
FOR- B, LIMIT 60
FEE- $60
LENGTH- 2 DAYS
METHODS- AV, LEC, LC, D, PAN

11271 ENTRY DATE 04/23/71 DELETE DATE 04/23/71
PEDIATRIC DAY:SUTTON LECTURESHIP
SPONSOR- MED COLL OF VA, HEALTH SCIENCES DIV, VA

COMMONWEALTH UNIV, BOX 91, RICHMOND, VIRGINIA 23219
LOCATION- SAME ADDRESS
FEE-
FOR- B
LENGTH- 1 DAY, 6 HRS.
METHODS- AV, LEC

11241 ENTRY DATE 04/26/71 DELETE DATE 04/30/71
PEDIATRIC RADIOLOGY
SPONSOR- UNIV OF MO-COLUMBIA MED CNTR & EXTENSION BLDG, 807 STADIUM RD, COLUMBIA, MISSOURI 65201
LOCATION- CHILDREN'S MERCY HOSP, KANSAS CITY
FEE- $175
FOR- S, LIMIT 15
LENGTH- 5 DAYS, 40 HRS.
METHODS- AV, BR, CLIN C, OP, PP, LAB, LEC, LC, O, SURG, PAN, PD, SEM
COMMENTS- BROCHURE AND APPLICATION FORM AVAILABLE

11268 ENTRY DATE 05/01/71 DELETE DATE 05/01/71
POSTGRADUATE PEDIATRIC CONFERENCE
SPONSOR- SCOTT & WHITE MEM HOSP & SCOTT, SHERWOOD & BRINDLEY FOUND, 2401 S 31ST, TEMPLE, TEXAS 76501
LOCATION- SAME ADDRESS
FEE- $10
FOR- B, LIMIT 150
LENGTH- 1 DAY, 5 HRS.
METHODS- AV, LEC, O, PAN, SEM

11003 ENTRY DATE 05/06/71 DELETE DATE 05/07/71
OPHTHALMOLOGY FOR THE INTERNIST, PEDIATRICIAN, AND GENERAL PRACTITIONER
SPONSOR-HARVARD MED SCH, DEPT OF CONT EDUC, 25 SHATTUCK ST, BOSTON, MASS 02115
LOCATION-MASS EYE AND EAR INFIRMARY, 243 CHARLES ST, BOSTON MASS 02114
FEE-$75
FOR-B, LIMIT-100
LENGTH-2 DAYS, 12 HOURS
METHODS-AV, LEC, PD

11215 ENTRY DATE 05/06/71 DELETE DATE 05/08/71
ADVANCES IN PEDIATRICS
SPONSOR- UNIV OF CALIF SCH OF MED, MED CNTR, 3RD & PARNASSUS AVES, SAN FRANCISCO, CALIF 94122
LOCATION- SAME ADDRESS
FEE-
FOR- B
LENGTH- 3 DAYS, 18 HRS.
METHODS- AV, CLIN C, LEC, O, PAN, SEM

10298 ENTRY DATE 05/10/71 DELETE DATE 05/14/71
ADOLESCENT MEDICINE I
SPONSOR- HARVARD MED SCHOOL, DEPT. OF CONT. EDUC. 25 SHATTUCK STREET, BOSTON, MASS. 02115
LOCATION- CHILDREN'S HOSP. MEDICAL CENTER, BOSTON
FEE- $175.00
FOR- B; LIMIT: 100
LENGTH- 5 DAYS, 32-36 HOURS
METHODS- AV, LEC, O, PAN, PD

11722 ENTRY DATE 05/10/71 DELETE DATE 05/14/71
ADOLESCENT MEDICINE I
SPONSOR- HARVARD MEDICAL SCHOOL, DEPT. OF CONTINUING EDUCATIO
25 SHATTUCK ST., BOSTON, MASS 02115
LOCATION- CHILDREN'S HOSPITAL MEDICAL CENTER
300 LONGWOOD AVE., BOSTON
FOR- PED.
LENGTH- 5 DAYS

10359 ENTRY DATE 05/12/71 DELETE DATE 05/13/71
SIXTH ANNUAL INDIANA MULTIDISCIPLINARY CHILD CARE CONFERENCE
SPONSOR- INDIANA UNIVERSITY, SCHOOL OF MEDICINE
1100 W. MICHIGAN ST., INDIANAPOLIS, IND. 46202
LOCATION- SAME ADDRESS
FOR- G, LIMIT 40/
DISCUSSION GROUP
LENGTH- 2 DAYS
COMMENTS- INFORMATION AVAILABLE

11257 ENTRY DATE 05/12/71 DELETE DATE 05/14/71
INFECTIOUS DISEASES
SPONSOR- AMER ACAD OF PEDIATRICS, 1801 HINMAN AVE,
EVANSTON, ILL 60204
LOCATION- UNIV OF OKLA MED CNTR, OKLAHOMA CITY
FEE- $75/MEMBER, $105/NONMEMBER FOR- S, LIMIT 100
LENGTH- 3 DAYS, 24 HRS.
METHODS- AV, CLIN C, LEC, LC, O, PAN, SEM

11258 ENTRY DATE 05/12/71 DELETE DATE 05/14/71
INFECTIOUS DISEASES AND IMMUNOLOGY
SPONSOR- UNIV OF OKLA MED CNTR, 800 NE 13TH ST,
OKLAHOMA CITY, OKLAHOMA 73104
LOCATION- SAME ADDRESS
FEE- FOR- B
LENGTH- 3 DAYS, 21 HRS.
METHODS- AV, LEC, O, PAN

11237 ENTRY DATE 05/17/71 DELETE DATE 05/21/71
PEDIATRICS- I
SPONSOR- HARVARD MED SCH, DEPT OF CONT EDUC,
25 SHATTUCK ST, BOSTON, MASSACHUSETTS 02115
LOCATION- MASS GEN HOSP, FRUIT ST, BOSTON 02114
FEE- $175 FOR- B, LIMIT 100+
LENGTH- 5 DAYS, 35 HRS.
METHODS- LEC, LC, O, PAN, PD, SEM

11651 ENTRY DATE 05/18/71 DELETE DATE 05/20/71
CARE OF THE HIGH RISK MOTHER, FOETUS, AND NEWBORN
SPONSOR- UNIVERSITY OF BRITISH COLUMBIA HEALTH SCIENCE CENTRE
CONTINUING EDUCATION DIVISION
TASK FORCE BLDG., VANCOUVER 8, BC, CANADA
LOCATION- SAME ADDRESS
FEE- $60.00
LENGTH- 3 DAYS

METHODS- LECTURES, DISCUSSIONS, DEMONSTRATIONS
COMMENTS- INFORMATION AND APPLICATION FORMS AVAILABLE

11230 ENTRY DATE 05/19/71 DELETE DATE 05/21/71
AMBULATORY CARE OF CHILDREN
SPONSOR- UNIV OF KY COLL OF MED, DEPT OF PEDIATRICS, 800 ROSE ST, LEXINGTON, KENTUCKY 40506
FOR- B, LIMIT 60
FEE- $75
LENGTH- 3 DAYS, 18 HRS.
METHODS- AV, BR, CLIN C, LEC, O, PAN, PD, SEM, TV

11246 ENTRY DATE 05/23/71 DELETE DATE 05/25/71
10TH ANNUAL PEDIATRIC POSTGRADUATE SYMPOSIUM-1971
SPONSOR- MAIMONIDES MED CNTR, 4802 10TH AVE, BROOKLYN, NEW YORK 11219
LOCATION- CONEY ISLAND HOSP, OCEAN & SHORE PKWYS, BROOKLYN 11235
FOR- B, LIMIT 250
FEE- $75
LENGTH- 3 DAYS, 21 HRS.
METHODS- AV, LEC, O, PAN, SEM

11247 ENTRY DATE 05/23/71 DELETE DATE 05/25/71
10TH ANNUAL PEDIATRIC POSTGRADUATE SYMPOSIUM
SPONSOR- STATE UNIV OF NY, DOWNSTATE MED CNTR, 450 CLARKSON AVE, BROOKLYN, NEW YORK 11203
LOCATION- CONEY ISLAND HOSP, OCEAN & SHORE PKWY, BROOKLYN 11235
FOR- B, LIMIT 250
FEE- $75
LENGTH- 3 DAYS, 21 HRS.
METHODS- AV, LEC, O, PAN, SEM

11209 ENTRY DATE 06/00/71 DELETE DATE 06/00/71
ANNUAL PEDIATRIC SEMINAR
SPONSOR- CHILDREN'S HEALTH CNTR, 8001 FROST ST, SAN DIEGO, CALIFORNIA 92123
LOCATION- LOCAL HOTELS
FOR- B
FEE- $30
LENGTH- 2 1/2 DAYS, 12 HRS.
METHODS- AV, PAN, SEM

11242 ENTRY DATE 06/01/71 DELETE DATE 06/01/71
PEDIATRICS
SPONSOR- CHILDRENS MEM HOSP, 42ND & DEAEY AVE, OMAHA, NEBRASKA 68105
LOCATION- SAME ADDRESS
FOR- B, LIMIT 100
FEE- $10
LENGTH- 1 1/2 DAYS, 10 HRS.
METHODS- AV, CLIN C, LEC, O, PAN, PD
COMMENTS- INFORMATION & APPLICATION FORM AVAILABLE

11248 ENTRY DATE 06/01/71 DELETE DATE 06/01/71
CLINICAL PHARMACOLOGY & PHARMACOGENETICS
SPONSOR- AMER ACAD OF PEDIATRICS, 1801 HINMAN AVE, EVANSTON, ILL 60204

MEDICAL LIBRARY REQUEST FORM

The following page is a Library Request Form for the Middleton Medical Library of the University of Wisconsin Medical School. You may request & borrow a specific book or reprint or you may designate a subject area in which the medical librarian will search. This service is free of charge to all Wisconsin physicians.

SPECIFIC REQUEST

Name of Requestor_____Telephone No.___-___-___

Address_____

Zip Code

Book
Author:

Title:

Edition and date:

Periodical article
Author:

Title:

Journal title:
Volume: Pages: Date:

REFERENCE REQUEST

Name of Requestor_____Telephone No.___-___-___

Address_____

Zip Code

Subject (as specific as possible):

Aspects (Circle): Etiology, diagnosis, therapy (any kind or specifically drug therapy, radiotherapy or surgery), complications, statistics, other_____

Subdivisions: Age_____Sex_____Ethnic group_____

Clinical_____ Experimental_____ Historical_____

Time period to cover (exhaustive literature searches are not done):_____

Languages:_____

Use (Circle): Clinical, research, paper, speech (professional group, laymen)

Other:_____

Sources checked (i.e. Index Medicus, Current Medical References, none):

Needed by (date):_____

Request information from: Medical Library Service
1305 Linden Drive
Madison, Wisc. 53706

A BIBLIOGRAPHY ON MEDICAL RECORD KEEPING

"A New Ambulatory Health Record", editorial in Group Practice, 2/70.

Baker, Terry, Nicholas J. Fiel, Peter Finklestein, Peter O. Ways, The Problem-Oriented Record (A Self-Instructional Unit); College of Human Medicine, Michigan State University, East Lansing, Michigan.

Bjorn, John C., M.D., and Harold D. Cross, M.D., The Problem-Oriented Private Practice of Medicine - A System for Comprehensive Health Care., Modern Hospital Press, Chicago, Illinois. McGraw-Hill Publications Company. 1970.

Engel, George L., M.D., "Care and Feeding of the Medical Student - The Foundation of Professional Competence", JAMA, Feb. 15, 1971, Vol. 215, No. 7. [Reprint requests to 260 Crittenden Blvd., Rochester, N.Y., 14620, (Dr. Engel)].

A Handbook for Research in General Practice, Ed. by T.S. Eimerl, M.D., and A.J. Laidlaw for The Royal College of General Practitioners, 2nd ed., E. & S. Livingstone Ltd., Edinburgh and London, 1969.

Kanner, Irving F., M.D., "Programmed Medical History-Taking with or without a Computer", JAMA, 207: 317-321, 1969.

Kanner, Irving F., M.D., "The Programmed Physical Examination With or Without a Computer", JAMA, Feb. 22 1971, Vol. 215, No. 8. (Reprint requests to Dr. Kanner at 800 Rose St., Lexington, Ky. 40506).

Lusted, Lee B., M.D., "Decision-Making Studies in Patient Management", The New England Journal of Medicine, Feb. 25, 1971, Vol. 284, No. 8. (Reprint requests to Dr. Lusted at Dept. of Radiology, University of Chicago, 950 East 59th Street, Chicago, Ill. 60637).

Renner, John H., M.D., "The Problem-Oriented Chart (Weed System)" in the Summary of the Workshop in Family Practice, May 21, 1970, held in Kansas City, Missouri, by the A.A.G.P. Commission on Education and the Sears-Roebuck Foundation.

Stein, Paul B., M.D., "The Use of the Problem Oriented Record for Teaching and Evaluation", from the Proceedings of the 1st Banff Workshop for Teachers of Family Medicine, 28 June to 1st July 1970; Sponsored by The Society of Teachers of Family Medicine and The Division of Continuing Medical Education, Faculty of Medicine, The University of Calgary.

"Ten Reasons Why Lawrence Weed is Right", editorial in The New England Journal of Medicine, Jan. 7, 1971, Vol. 284, No. 1.

Weed, Lawrence L., M.D., "What Physicians Worry About: How to Organize the Care of Multiple-Problem Patients", Modern Hospital 110: 90-94, 1968.

Weed, Lawrence L., M.D., "Medical Records that Guide and Teach:, The New England Journal of Medicine, March 14, 1968, Vol. 278 No. 11; Conclusion in N.E.J.M., March 21, 1968, Vol. 278 No. 12.

Weed, Lawrence L., M.D., Medical Records, Medical Education, and Patient Care, The Problem-Oriented Record as a Basic Tool, The Press of Case Western Reserve University, Distributed by Year Book Medical Publishers, Inc., Chicago, 1970.

Compiled by Family Practice Program. Post-graduate Medicine.

PHYSICIAN'S PROFILE INTERVIEWS
TASKS DELEGATED TO ASSISTANTS BY PHYSICIAN

	Done by: M.D.	R.N.	Tech.	Nurse's Asst.	Sec.	Other
1. Telephone						
2. Triage Screening						
3. Medical record keeping and retrival of information						
4. History taking						
5. Obtaining speciman's for lab work						
6. Laboratory tests						
7. Allergy tests						
a. scratch						
b. intradermal						
8. Measurements						
a. weight & height						
b. temperature						
c. B.P.						
9. ECG's						
10. Routine pap smears						
11. X-rays						
12. Pregnancy tests						
13. Audiometry						
14. Tonometry						
15. Breast exams						
16. Physical exams (eye, ear, nose, throat, sometimes entire exam)						
17. Sigmoidoscopy						
18. Sigmoidscopy exam assistancy						
19. Well-baby checks						
20. Wound dressing, application & changing						
21. Diagnosing under physician's supervision						

TASKS DELEGATED TO ASSISTANTS (CONT.)

	Done by: M.D.	R.N.	Tech.	Nurse's Asst.	Sec.	Other
22. Suturing						
23. Suture removal						
24. Injections						
25. Cast application						
26. Cast removal						
27. Physiotherapy						
28. Initiate emergency treatment for shock, cardiac arrest, etc						
29. Ear irrigation						
30. Bladder irrigation & dilation						
31. Postural drainage						
32. Ankle taping						
33. Surgery assistancy (other than M.D.)						
34. Patient instruction						
35. Patient counseling						
36. Phoning in prescriptions						
37. Keeping records of prescriptions						
38. Prescribing under physician's supervision						
39. Home care visits (following patient's progress)						
40. Emergency house calls (when physician not available)						
41. Hospital rounds						
42. Nursing home visits						
43. Training other assistants						
44. Maintaining patient traffic flow						

EDUCATIONAL RESOURCE INDEX REQUEST FORM

DISEASE CATEGORIES	Conf.	P.T.	Audio-Visual	Prog. Inst.	Texts & Journals
1-1. Infective & Parasitic					
2-1. Malignant neoplasms not of Blood					
2-2. Neoplasms of Blood & Lymphatic					
2-3. Benign neoplasms					
2-4. Neoplasms unspec.					
3-1. Diabetes					
3-2. Obesity					
3-3. Endo., Metab. & Nutritional					
4-1. Diseases of the Blood					
5-1. Mental Disorders					
6-1. Diseases of the C.N.S.					
6-2. Eye & Ear					
7-1. Rheumatic Fever & Heart Disease					
7-2. Hypertension					
7-3. Ischemic heart disease					
7-4. Other heart diseases					
7-5. Cerebrovascular disease					
7-6. Other Vascular Diseases					
7-7. Cardiovascular unspecified					
8-1. Acute Respiratory Infections					
8-2. Bronchitis, Emphysema, Asthma					
8-3. Other Respiratory Diseases					
8-4. Respiratory System unspec.					
9-1. Oral cavity, salivary glands, jaws					
9-2. Esophagus, stomach & duodenum					
9-3. Intestine & peritoneum					
9-4. Liver, gallbladder, & pancreas					
9-5. Gastrointestinal System unspec.					
10-1. Urinary System					
10-2. Male genital organs					
10-3. Breast & Female genital organs					
10-4. Genitourinary System unspec.					
11-1. Comp. of Pregnancy & Puerperium					
11-2. Delivery					
12-1. Skin & Subcutaneous Tissue					
13-1. Arthritis & Rheumatism					
13-2. Mus. skeltal. sys., Conn. Tissue					
14-1. Congenital Anomalies					
15-1. Perinatal morbidity and mortality					
16-1. Symptoms & Ill-defined conditions					
17-1. Fract., Disb., Sprains, Strains					
17-2. Other trauma incl. Burns					
17-3. Adverse Drug effects and poisoning					
17-4. Other adverse effects					
18-1. General Exam					
18-2. Radiological Examination					
18-3. Well baby & child care					
18-4. Pre-natal Exam					
18-5. Post-partum					
18-6. Contraception					
18-7. Other Exams w/out Illness					
18-8. Post-op. care & Rehabilitation					
18-9. Practice management					
18-10. General programs					

Exhibit 9

Participant No. 22552

I.P.P. Follow-up
June '71

Utilizing the following scale in questions I, II and III check the box that best describes your opinion.

I. As to recognizing my educational needs, I found participation in I.P.P. to be:

Very Helpful			Helpful			Not Helpful		
1	2	3	4	✓ 5	6	7	8	9

II. As to the procedures used in I.P.P. I found:

	Very Helpful			Helpful			Not Helpful		
A. Profiling (pt. problems)	1	✓ 2	3	4	5	6	7	8	9
B. Examination	1	✓ 2	3	4	5	6	7	8	9
C. Consultation	1	✓ 2	3	4	5	6	7	8	9
D. The whole program	1	✓ 2	3	4	5	6	7	8	9

III. I found the information about my practice (% females, % of patients under 40, av. number of office pts seen/day etc.)

Very interesting			interesting			of no interest		
1	✓ 2	3	4	5	6	7	8	9

In questions IV through VII please make the indicated response.

IV. Have you completed one or more of the recommended educational programs?

Yes ✓ No ____

A. If yes, which one or ones (please describe)

MEETing - Am. Acad. Peds Spring '71

B. If yes, did it or they meet or fail to meet your needs?

(please comment)

No ?

V. Did you find the print out from the Educational Resource Index (recommended educational programs) easy to understand and use?

Yes ✓ No ____

A. If you answered "no" please comment why.

VI. Would you consent to a second (post) test? Yes ✓ No ____

VII. From your standpoint what are the "bugs" in I.P.P.? (don't be kind, use the other side and an extra sheet if necessary, your criticisms can only be beneficial)

TEST SHEET - Should be Able To
ERASE A MISGUESS

Answers should be mailed out
AFTER TEST is TAKEN - probably
with TEST Results & Analysis

*=in thousands

Exhibit 10

General Practitioners

ysician Code #	Physician Age	Yrs. in Practice	Size of Community*	# of Drs. in Community	Medical Education
10016	36	11	2	2	Wisc. 1959
13029	47	20	3	3	Wisc. 1950
14056	31	5	163	475	Minn. 1965
15028	40	13	37	69	Cinnci. 1957
16049	41	14	5	3	Nebraska 1956
16218	45	23	6	11	Wisc. 1947
16347	40	15	7	9	Wisc. 1955
20021	40	11	163	475	Wisc. 1959
20045	31	5	7	9	Marquette 1966
20080	38	13	10	11	Wisconsin 1957
21455	42	18	3	3	Wisconsin 1952
22222	57	32	34	22	Wisconsin 1938
23668	31	5	14	15	Michigan 1965
24093	53	24	8	6	Wisconsin 1946
24246	49	25	34	60	Wisconsin 1945
25045	30	5	2	4	Wisconsin 1965
25573	34	8	6	11	Minnesota 1962
26044	55	29	7	10	Marquette 1941
26225	45	21	2	7	Wisconsin 1949
32053	41	16	7	10	Wisconsin 1954
35006	39	9	163	475	Wisconsin 1961
35061	59	32	2	3	Wisconsin 1938
36151	41	8	2	4	Marquette 1962
36247	37	11	34	60	Georgetown 1959
36375	41	10	5	11	Wisconsin 1960
42083	65	33	4	5	Wisconsin 1937

*=in thousands

General Practitioners

ıysician Code #	Physician Age	Yrs. in Practice	Size of Community*	# of Drs. in Community	Medical Education
42553	46	19	2	3	Wisconsin 1951
43675	40	15	3	8	Wisconsin 1955
45529	36	9	8	9	Wisconsin 1961
46078	49	25	8	15	Chicago 1945
46540	44	15	4	1	Manitoba 1955
50016	50	25	4	7	Wisconsin 1945
51328	40	9	1	1	Maryland 1961
52017	38	12	13	31	Iowa 1958
52030	41	16	2	1	Illinois 1954
52047	33	6	5	3	Wisconsin 1964
52619	33	8	8	9	Illinois 1962
54053	35	10	3	8	Indiana 1960
55074	41	13	13	31	Iowa 1957
55076	36	6	5	4	Wisconsin 1964
55232	31	6	2	4	Wisconsin 1964
55247	33	8	7	10	Nebraska 1962
55352	39	8	38	69	Wisconsin 1962
55649	30	5	2	4	Columbus, O. 1965
56343	36	10	1	3	Indiana 1960
60045	44	19	163	475	Cinncinnati 1951
60053	40	15	741	1105	Kirksville, Mo. 1956
60089	48	21	3	5	Chicago 1947
61275	42	17	163	475	Iowa 1953
61417	48	24	6	11	Wisconsin 1946
61516	31	6	2	4	Wisconsin 1964
61576	48	22	13	31	Temple 1948

*=in thousands

General Practitioners

ıysician Code #	Physician Age	Yrs. in Practice	Size of Community*	# of Drs. in Community	Medical Education
62029	44	18	163	475	Wisconsin 1952
62088	49	17	34	60	Nebraska 1951
62352	42	16	4	10	Yale 1954
62392	42	15	2	4	Nebraska 1956
63053	64	38	5	7	Rochester, N.Y. 1932
63253	41	14	2	7	Wisconsin 1964
64233	33	7	4	3	Wisconsin 1964
65020	36	11	3	8	Wisconsin 1959
65233	32	3	163	475	Wisconsin 1966
66331	42	16	163	475	Illinois 1954
77777	44	21	3	8	Marquette 1949

PEDIATRICS

Physician Code #	Physician Age	Yrs. in Practice	Size of Community*	# of Drs. in Community	Medical Education
11047	31	5	9	16	La. State 1965
20083	46	23	9	16	Wisconsin 1947
22552	35	7	9	16	Wisconsin 1962
31310	47	15	63	67	Kansas 1955
50050	45	13	35	60	Hahnemann 1957
62075	44	19	63	119	St. Louis 1956
62079	52	27	63	119	N.Y.-Buffalo 1943

INTERNAL MEDICINE

20025	35	4	53	120	Loyola 1960
23076	49	25	33	42	Wisconsin 1945
23083	37	12	63	119	Wisconsin 1958
25016	35	11	63	119	St. Louis 1959
62048	46	14	53	120	Northwestern 1958

GENERAL SURGERY

30077	34	9	13	15	Columbia 1961

* = in thousands

76 MD's

	Age	Years in Practice	Size of Community*	Number of MD's in Community
Hi	65	38	741	1105
Low	30	3	1	1
Average	41.5	14.9	40.5	92.8

63 GP's

Hi	65	38	741	1105
Low	30	3	1	1
Average	41.4	14.93	39.6	89.36

7 PEDS

Hi	52	27	63	119
Low	31	5	9	16
Average	42.85	15.5	36	59

I.M.

Hi	49	25	63	120
Low	35	4	33	42
Average	40.4	15.2	53	104

* in thousands

GENERAL PRACTITIONERS

Dr. Code #	Method of Patient Contact (average per day)					Sex of Patient		
	Total Patient Contacts	Office	Phone	Hospital	Home	% Male	% Female	% Unknown
10016	77	24	18	27	7	46	51	3
13029	44	28	8	8	-1	35	60	5
14056	53	30	13	10	0	35	54	11
15028	60	30	22	8	0	38	58	4
16049	60	52	±1	6	1	43	57	0
16218	29	13	3	11	0	42	58	0
16347	24	20	1	3	0	63	37	0
20021	49	35	7	7	0	39	53	9
20045	59	35	3	19	1	27	66	7
20080	39	22	6	9	0	38	59	3
21455	61	44	4	11	2	46	54	4
22222	37	25	3	9	.25	52	44	4
23668	42	23	8	7	4	54	41	5
24093	42	24	3	5	0	38	60	2
24246	36	20	6	7	1	42	58	0
25045	33	18	2	11	.25	45	55	0
25573	45	27	9	6	.5	38	60	2
26044	42	23	7	11	.75	34	61	5
26225	31	22	--	6	1	42	56	±1
32053	47	24	11	11	.25	31	67	2
35006	50	34	13	2	.5	42	48	0
35061	72	48	9	13	.5	32	57	11
36151	60	35	11	11	.75	34	65	1
36247	102	44	37	13	7	24	65	11
36375	53.5	32.2	11.5	8.7	1	63	32.2	0
42083	67	43	2	1.25	1.25	39	57	4
42553	59	28	13	17	1	44	52	4
43675	43	19	5	17	0	25	61	14
45529	36	20	6	12	0	38	61	1
46078	32	18	4	11	.25	32	61	7
46540	88	66	10	10	1	42	53	5
50016	44	27	2	14	1	37	63	0
51328	59	41	14	4	.25	47	52	1
52017	53	28	17	8	0	32	67	1
52030	48	37	9	3	.25	47	48	5
52047	36	17	6	14	0	53	46	1
52619	32	25	1.5	5.2	0	56.6	43.4	0
54053	41	25	6	8	0	39	59	2
55074	38	28	6	4	0	39	61	±1
55076	42	17	7	17	0	46	53	1
55232	25	23	1	.75	.5	56	42	2
55247	38	26	5	8	0	42	54	4
55352	52	25	16	9	2	35	61	4
55649	34	27	3	4	0	57	43	±1
56343	37	25	5	6	.5	46	54	0
60045	73	50	20	3	0	40	58	2
60053	77	45	22	9	1	36	62	2
60089	61	36	8	17	0	38	62	±1
61275	70	44	18	9	0	39	61	±1

GENERAL PRACTITIONERS

	Method of Patient Contact (average per day)					Sex of Patient		
Dr. Code #	Total Patient Contacts	Office	Phone	Hospital	Home	% Male	% Female	% Unknown
61417	46	29	5	12	0	24	74	2
61516	23	16	3	4	.25	37	63	0
61576	53	29	14	8	0	33	67	0
62029	73	41	21	9	1.75	35	56	9
62088	43	21	11	11	.25	32	66	2
62352	54	29	11	15	0	38	61	1
62392	108	73	9	20	0	48	51	1
63053	54	27	6	20	.25	41	57	2
63253	52	22	11	17	1	47	53	3
64233	55	36	7	4	±1	40	58	2
65020	48	26	8	13 •	0	34	65	1
65233	40	31	7	3	0	44	56	0
66331	44	30	11	3	0	42	49	9
77777	45	23	14	7.5	0	32	67	1

PEDIATRICS

Dr. Code #	Method of Patient Contact (average per day) Total Patient Contacts	Office	Phone	Hospital	Home	Sex of Patient % Male	% Female	% Unknown
11047	23	15	6	3	0	63	23	12
20083	51	22	20	16	0	40	59	1
22552	36	21	10	3	0	46	42	12
31310	54	34	9	9	±1	43	45	12
50050	64	33	20	10	0	39	39	22
62075	51	34	9	8	0	51	49	2
62079	45	25	10	10	0	31	28	41

INTERNAL MEDICINE

20025	28	14	5	10	0	27	60	13.5
23076	26	16	1	7.5	0	60	40	0
23083	31	20	9	2	0	39	61	0
25016	23	12	4	6	0	41	57	2
62048	48	19	9	20	.5	48	43	8.9

GENERAL SURGERY

30077	37	5	8	20.7	1	68	31	0

	Method of Patient Contact average per day									Sex of Patient		
										%	%	%
										Male	Female	Unknown
	(63 G.P.s)											
	Total #	Office	%	Phone	%	Hospital	%	Home	%			
Hi	108	73	71%	37	34%	27	25%	7	6%	63%	74%	14
Low	23	13	57%	1	4%	1	4%	0		24%	32%	0
Average	51	31	61%	9	18%	9.5	19%	-		40%	56%	3
	(76 M.D.s)											
Hi	108	73	71%	37	34%	27	25%	7	6%	68%	74%	41%
Low	23	5	22%	1	4%	.75	3%	0		24%	23%	0
Average	36	21	58%	9	25%	9	25%	-		41.8%	43.6%	9.8%
	(13 Spec.)											
Hi	64	34	53%	20	31%	20	31%	1	1.5%	68%	61%	41%
Low	23	12	52%	1	4%	2	9%	-		27%	23%	0
Average	37	21	57%	9	24%	10	27%	-		45%	44%	10%
	PEDS											
Hi	64	34	53%	20	31%	16	25%	1	1.5%	63%	59%	41%
Low	23	15	65%	6	26%	3	13%	0		31%	23%	1%
Average	46.2	26	56%	12	26%	8.4	18%	-		45%	41%	15%
	I.M.											
Hi	48	20	42%	9	19%	20	42%	-		59%	61%	13%
Low	23	12	52%	1	4%	2	9%	-		27%	38%	0
Average	31	16	52%	6	19%	9	29%	-		43%	52%	6%

Code NO. / Cat.	% of Total Practice																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
General Practice																		
10016	3.0	6.3	5.2	.9	6.9	3.7	16.3	10.0	3.7	2.8	.9	4.8	1.1	.2	0	8.7	8.9	18.2
13029	3.4	1.3	2.6	0	.4	3.9	9.5	12.5	3.9	3.0	.4	7.3	3.0	0	0	6.9	9.9	31.9
14056	3.1	.7	4.8	0	.7	6.5	3.1	16.4	4.1	1.7	4.5	2.7	1.0	.7	.7	5.1	8.6	35.6
15028	3.9	2.4	5.0	.3	6.3	3.7	8.4	10.0	5.0	6.1	.3	2.9	2.1	.5	0	10.3	6.8	26.1
16049	3.2	1.6	3.8	1.6	4.3	2.4	8.9	13.5	3.5	2.8	.5	2.4	4.3	.3	0	9.2	11.6	20.8
16218	2.2	4.8	4.8	1.7	5.2	3.9	14.3	6.9	16.0	3.9	.9	1.3	10.0	.4	0	6.5	5.6	11.3
16347	2.1	3.5	5.0	0	.7	2.8	19.1	8.5	4.3	8.5	0	.7	7.8	0	0	4.3	11.3	22.0
20021	10.2	1.9	2.9	.3	2.5	4.5	5.1	22.0	3.2	5.1	.6	3.5	2.2	1.3	.6	3.5	8.0	22.6
20045	2.1	3.6	5.6	.5	1.3	3.1	10.3	9.7	6.2	5.6	3.6	1.0	3.8	1.5	.3	3.8	6.2	29.5
20080	1.1	11.5	3.6	1.1	3.6	3.3	15.7	8.5	6.0	6.0	0	2.7	4.7	.3	0	8.5	11.3	12.1
21455	2.7	1.9	3.6	.2	3.2	5.9	8.8	10.2	3.9	4.1	1.7	4.1	2.2	.7	.2	15.6	14.6	10.3
22222	2.2	2.6	11.0	1.3	1.8	4.4	22.8	8.8	4.8	.9	0	.9	6.6	0	0	12.3	7.0	12.3
23668	.7	.7	3.0	.4	3.8	3.8	9.1	11.0	3.8	5.3	0	1.9	3.0	2.3	0	17.8	8.3	24.6
24093	5.6	2.8	3.7	.5	2.3	4.2	7.4	8.8	2.3	4.7	2.3	4.2	1.4	.9	0	6.0	10.2	32.6
24246	2.6	3.7	.7	3.0	1.1	.7	11.2	8.6	7.8	4.8	1.6	3.7	4.5	.4	0	21.3	11.6	13.9
25045	2.2	5.9	4.8	0	2.6	5.6	14.9	11.5	2.4	4.5	0	2.6	1.9	.4	0	13.8	7.8	13.8
25573	1.7	1.0	6.6	2.0	6.3	2.6	16.8	9.2	2.0	5.6	.3	4.3	5.3	.7	0	5.9	12.2	17.2
26044	.4	7.9	3.9	.4	1.9	4.7	8.6	7.1	5.5	4.3	4.3	.8	3.9	.4	.4	10.2	3.9	27.6
26225	4.3	2.5	1.8	0	5.0	3.1	12.4	8.1	4.3	5.0	1.2	3.1	3.1	.6	0	9.3	12.4	24.8
32053	2.7	4.3	3.3	1.0	3.7	3.7	7.3	8.6	4.7	5.0	1.0	4.3	1.0	.7	.7	17.3	5.6	25.2
35006	7.7	.7	3.7	2.0	3.7	9.1	3.4	12.8	3.4	6.7	0	4.0	2.7	0.3	0	25.5	8.7	23.8
35061	3.7	3.7	11.7	2.9	3.9	1.0	15.0	22.4	6.4	9.0	.2	3.9	2.3	.2	0	2.5	5.7	22.0
36151	4.2	2.4	6.2	.9	3.3	1.5	13.9	9.7	4.6	5.9	1.3	7.5	5.1	.4	.2	6.2	8.8	17.8
36247	2.2	.7	1.7	0	1.2	1.9	1.7	19.1	1.2	3.3	0	2.4	.5	.2	.2	12.1	3.3	49.0
36375	3.7	6.1	4.3	2.3	3.5	6.3	2.6	12.6	7.8	1.7	.9	2.3	.9	.3	.3	12.1	6.3	26.8
42083	.9	1.7	6.9	2.2	1.7	3.5	12.1	15.6	5.2	13.4	.4	4.8	3.9	0	0	4.3	1.7	26.0
42553	1.6	3.1	4.5	.2	5.9	3.1	18.6	13.0	4.5	4.5	.2	3.5	.7	0	0	4.5	10.6	18.9
43675	1.5	3.0	2.3	.8	2.3	3.0	18.5	15.4	4.7	6.4	1.5	3.0	4.5	0.8	0	3.4	4.5	24.2

Code No. \ Cat.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
45529	4.3	1.4	1.9	1.0	1.0	2.9	5.7	19.0	4.8	1.4	2.4	2.4	1.4	.5	0	8.6	9.5	31.9
46078	1.8	6.4	2.3	.5	1.4	4.1	8.7	11.9	4.6	2.3	2.3	3.7	3.2	0	0	8.2	10.5	28.7
46540	3.0	2.9	5.0	.4	3.2	5.6	13.4	13.4	5.4	4.8	0	2.0	4.3	.5	0	10.8	5.6	19.5
50016	2.8	3.4	10.3	.3	.9	5.6	8.1	11.6	8.4	1.9	0	4.1	10.6	.3	0	6.9	8.1	13.8
51328	4.0	3.5	6.2	1.6	3.8	3.2	8.0	16.6	4.8	6.4	0	4.3	5.6	.3	.5	4.8	7.0	19.3
52017	7.3	2.4	3.6	.3	3.3	1.8	7.9	17.9	4.3	4.9	.3	3.0	1.5	0	0	14.6	5.8	21.0
52030	7.0	2.9	3.8	1.9	6.4	3.8	8.9	8.0	3.2	3.8	1.0	2.9	2.5	1.0	0	8.6	10.2	24.2
52047	.9	4.9	4.3	1.9	4.3	4.9	15.7	9.3	9.6	5.2	.6	3.1	4.0	.3	0	12.0	10.5	11.7
52619	2.7	1.6	5.8	.8	9.7	7.4	11.3	11.3	7.8	3.8	.8	1.2	1.9	.4	0	13.6	8.2	12.1
54053	4.8	2.2	5.1	.6	4.8	2.9	12.2	17.0	3.5	3.2	1.0	2.9	5.1	.3	.6	7.4	12.5	13.7
55074	1.7	3.9	3.9	.4	.4	6.9	5.2	19.5	2.6	7.8	.4	1.3	3.5	3.0	0	8.7	8.7	22.0
55076	4.1	4.6	6.3	1.7	8.3	2.9	12.6	7.5	6.7	6.7	.5	5.1	4.4	.7	1.0	9.0	11.2	7.0
55232	1.2	1.8	4.3	0	3.1	4.3	11.7	9.2	0	3.7	0	4.9	1.2	.3	0	12.9	15.9	25.2
55247	1.8	2.3	1.4	.9	2.7	8.1	10.5	8.6	3.2	3.6	.9	3.6	.9	0	0	9.9	17.6	24.3
55352	4.2	1.2	4.6	0	6.7	2.7	3.4	8.8	4.2	5.8	1.2	3.0	2.1	.6	0	10.7	12.8	27.7
55649	1.8	2.2	1.8	.9	2.2	4.9	5.4	12.6	4.5	2.7	.4	4.5	2.2	.9	0	17.0	14.8	21.1
56343	2.3	2.8	4.6	0	4.1	5.0	8.7	12.4	4.1	5.5	0	1.4	3.7	1.4	0	7.3	20.2	16.0
60045	5.8	1.0	3.4	.5	3.4	5.5	4.1	18.9	2.9	3.6	1.7	2.6	1.7	.7	.5	3.8	13.2	26.9
60053	.4	4.2	9.0	2.5	2.7	2.5	12.4	13.4	4.8	6.1	0	1.5	8.2	.8	0	11.3	10.3	9.9
60089	1.6	1.9	6.2	2.2	3.3	3.9	22.7	12.1	1.9	4.2	.2	3.1	2.9	.2	0	9.1	10.6	13.5
61275	1.2	.5	7.4	.5	5.8	3.0	10.5	14.2	3.7	6.5	.2	3.2	3.7	.7	.2	5.3	14.7	18.6
61417	1.7	6.1	4.6	.6	1.4	1.2	7.8	2.1	4.6	14.7	2.3	2.9	6.1	1.2	0	12.4	4.3	26.0
61516	2.7	3.4	.7	1.4	1.4	2.1	4.8	8.2	8.2	6.2	0	4.8	0	0	0	21.2	15.1	19.9
61576	1.5	5.8	5.5	1.1	10.2	3.5	9.3	7.9	4.7		1.5	1.7	3.5	0	.3	17.5	5.0	17.8
62029	6.7	3.2	1.5	1.2	8.0	4.2	7.5	13.9	3.0	4.5	1.5	2.5	2.5	1.0	.2	10.0	9.5	19.4
62088	1.0	3.7	4.4	2.0	1.4	3.1	13.2	4.8	4.1	3.7	.3	2.4	2.4	.3	.3	19.7	4.1	28.9
62352	.6	2.3	3.8	.9	2.6	2.9	10.5	9.0	4.7	5.2	1.7	2.9	1.7	0	0	17.8	13.1	20.1

Code No. \ Cat.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
62392	2.7	3.1	7.7	2.1	5.9	3.8	15.4	13.0	4.1	3.2	.1	3.5	3.9	.4	0	5.2	9.1	16.9
63053	.5	5.3	4.3	.3	1.5	2.8	15.9	4.8	6.3	7.1	.8	3.6	4.3	1.0	0	11.9	12.9	16.5
63253	1.7	1.5	3.7	1.0	4.4	2.5	19.3	7.4	9.4	5.2	0	1.5	1.5	.2	0	10.1	12.6	18.0
64233	1.7	.7	2.7	.3	1.0	1.7	6.8	10.6	4.1	3.4	.3	4.4	2.4	.3	0	11.9	14.3	29.3
65020	3.8	2.8	6.2	1.4	5.5	3.4	12.4	13.4	3.4	3.1	2.8	4.1	1.7	.3	1.7	4.8	7.9	20.9
65233	7.7	0	3.3	.4	3.3	1.6	3.3	11.8	2.8	1.2	1.2	3.7	1.6	.8	0	8.1	10.6	38.6
66331	3.7	1.5	8.9	.7	4.8	3.7	14.8	10.4	4.4	5.2	0	4.1	1.9	.4	0	7.8	5.6	22.2
77777	4.4	.8	6.5	1.2	7.3	3.2	10.1	9.3	10.5	4.8	.4	4.0	2.0	.4	0	4.8	12.9	17.3
Pediatrics																		
11047	2.7	0	1.1	2.7	.5	7.9	1.1	18.4	2.7	2.7	0	12.2	.5	3.7	.5	12.8	11.2	19.7
20083	4.1	1.3	1.3	1.6	1.6	3.1	.6	14.8	3.8	5.0	2.5	2.2	1.3	2.5	.3	19.2	4.4	30.5
22552	5.6	0	1.3	3.4	2.1	3.8	.9	7.7	6.8	2.1	0	4.3	2.1	.4	3.0	10.3	17.9	28.2
31310	5.6	0	2.1	1.8	.9	13.2	2.6	21.4	3.5	2.1	0	1.5	.3	2.9	2.6	7.6	11.1	20.8
50050	6.6	.6	.6	1.7	1.2	5.8	0	21.6	.6	.3	0	2.9	.6	1.7	2.3	12.4	3.2	38.0
62075	3.6	.3	1.1	0	0	9.6	0	23.9	.3	1.8	0	4.3	.6	3.6	.6	7.9	1.8	39.1
62079	4.3	0	1.9	.8	3.9	5.1	.8	28.0	1.6	.8	0	1.2	1.6	1.2	2.7	10.1	3.5	53.7
Internal Medicine																		
20025	.9	11.7	6.9	.9	1.3	3.0	20.8	6.9	7.4	.9	0	.4	6.1	.9	0	14.7	3.9	12.6
23076	2.7	1.0	10.3	.3	5.5	3.4	26.1	12.4	5.8	2.7	0	1.0	5.8	.3	0	14.1	4.5	3.8
23083	2.3	2.3	12.7	.6	5.2	3.5	28.3	12.1	2.9	2.9	0	.6	4.0	.6	0	13.3	2.3	6.4
25016	6.2	.5	8.3	.5	4.2	2.1	26.0	6.8	6.8	3.6	.5	1.6	2.6	2.6	0	13.5	3.6	10.4
62048	1.0	1.6	9.5	.3	5.7	7.3	16.1	5.7	6.6	6.0	0	.6	5.7	.3	0	12.9	3.8	17.0
Surgery																		
30077	2.4	8.4	1.4	.6	2.1	.9	7.2	6.6	11.4	12.3	0	1.2	.9	1.4	0	9.3	13.5	17.4

Exhibit 11

Physician/Patient Data

Total number of physician's - 76
63 G.P.
7 Peds
6 I.M.
1 G.S.

Total # of Diagnosis in 18 Categories
by 1st-6th diagnosis classification

Category	1st	2nd	3rd	4th	5th	6th	Total
1	544	135	37	12	3	1	732
2	370	214	68	28	9	3	692
3	558	342	152	58	18	5	1,133
4	89	99	44	12	7	--	251
5	492	242	90	27	13	--	864
6	606	215	78	28	8	4	939
7	1,234	794	336	140	42	18	2,564
8	2,043	656	162	38	15	3	2,917
9	670	299	118	37	21	9	1,154
10	683	286	110	36	19	9	1,143
11	96	67	6	2	--	--	171
12	485	195	51	19	6	3	759
13	448	179	69	21	9	7	733
14	76	58	24	8	1	1	168
15	50	16	5	3	--	--	74
16	1,234	760	286	101	25	3	2,409
17	1,569	412	104	31	19	4	2,139
18	3,239	1,346	353	81	29	21	5,069
Total	14,486	6,315	2,093	682	244	91	23,911

1. Infective and Parasitic
2. Neoplasms
3. Endo., Nutrition, Metab.
4. Blood, Blood-Forming Organs
5. Mental Disorders
6. Nervous System, Sense Organs
7. Circulatory System
8. Respiratory System
9. Digestive System
10. Genitourinary System
11. Preg. Childbirth, Puerperium
12. Skin and Subcutaneous Tissue
13. Mus. skeltal. Conn. Tissue
14. Congenital Anomalies
15. Perinatal Morbidity, Mortal.
16. Symptoms, Ill-Defined Cond.
17. Fract., Trauma, Poisoning
18. Spec. Cond., Exam s Sickness

Appendix A

Development of a Clinical Test Bank

Testing of physicians to determine the level of their medical knowledge, under the best of conditions, is a difficult undertaking. The Individual Physician Profile project required such testing as a major part of the process; it also imposed additional challenges: (1) there must be the capability of testing in any area of clinical medicine, (2) each test instrument must be developed in relation to a specific medical practice, and (3) this testing capability must be developed under severe time constraints.

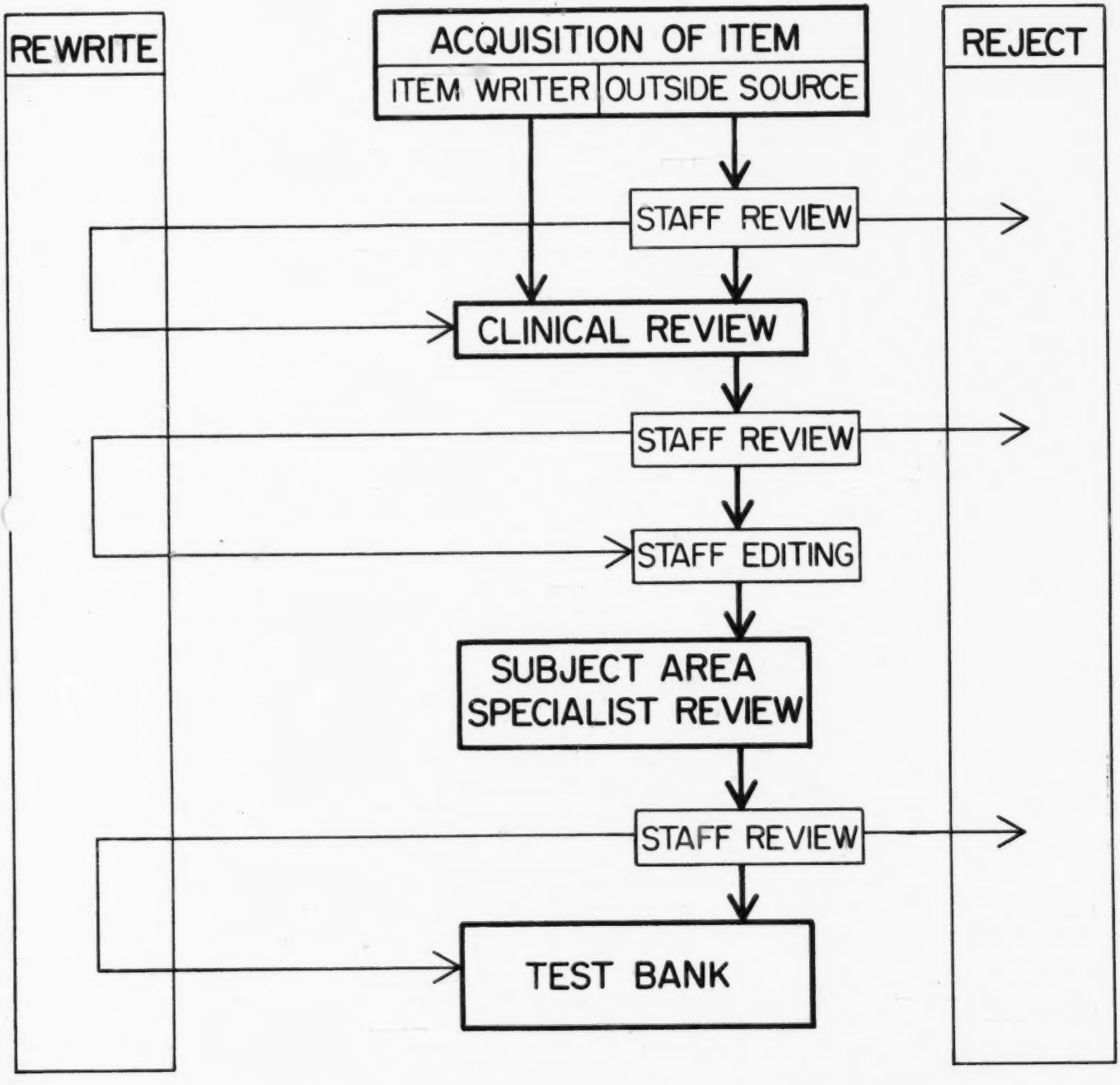
It was decided that the project required a comprehensive test bank from which appropriate questions could be selected to devise the individual test instruments required. Since each test would be different, it was not considered possible to utilize traditional methods of establishing the validity and reliability of each instrument. Consequently, an alternate approach of devising a rationale and procedure which, if followed, could be expected to result in a degree of validity and reliability was developed.

This approach concentrates on establishing the quality of each question entered into the test bank, with the assumption that a test instrument composed of such questions on the basis of certain criteria retains that element of quality. It makes further assumptions that this quality can be established on the basis of review by clinicians and subject area specialists.

In order to obtain the quality judgments of clinicians and subject area specialists, an item review cycle was established; this is diagramed on the following page.

The main course of an item through the review process is: (1) acquisition - either from an outside source or written by a staff physician, (2) clinical review - by mailing out to a practicing physician and obtaining his judgment on a rating

ITEM REVIEW CYCLE



sheet (Exhibit 1), and (3) scientific review - by mailing to the subject area specialist on the faculty and obtaining his judgment on a rating sheet (Exhibit 2). At each point along the way there is staff review with a judgment as to whether the item can proceed to the next step, requires minor revision, requires major revision, or should be rejected. In addition, once an item passes clinical review, it undergoes editing to assure proper format, spelling, etc.

Experience with the cycling process gave a certain degree of confidence that each item was subjected to critical review by the clinicians and subject area specialists. There was a high attrition rate, even though the majority of the items had been used in one form or another for testing physicians or those in medical training. The majority of items that survived the cycle were diverted from the main course at one or more points in the cycle for re-writing. Consequently, it has been concluded that the physicians involved in the cycling process performed their assigned tasks and, if the criteria used are valid, the test bank constitutes a unique resource in testing on various aspects of clinical medicine.

With the knowledge that a substantial test bank must be developed in a relatively short time, a number of experiments were conducted with the intent of assuring proper quality judgments on the part of the clinicians involved, and determining the most efficient methods by which this could be done. The experiments tested the following hypotheses:

Hypothesis #1. Individual clinicians making value judgments on the items do not represent a significant source of variation.

In the interests of economy of time, it was proposed that each item be cycled through only one clinician; this required that a degree of inter-rater reliability be established. In the experiments conducted, individual items were cycled through a number of physicians and their ratings compared.

In general, the factors related to clinician judges tended to show no significant source of variation.

Hypothesis #2. Staff judgments on the general quality of an item will agree with the responses of the clinician judges.

As non-medical staff carried out their duties in cycling items, they developed an ability to make judgments as to whether a specific item was "good" or "bad",

or of "questionable" value. The experiments confirmed that the judgments of "good" and "bad" questions correlated with those of the clinician judges. The clinicians, however, rated the "questionable" items more favorably than either of the extremes.

The result was that the staff could be more efficient by immediately rejecting those items they judged "bad", and not taking up the valuable time of the clinician in confirming this judgment. Therefore, only those questions that could be expected to survive the review process would be cycled. The results gave equal justification for by-passing clinical review of those items judged "good" by the staff, but suggestions made by clinicians for improving these questions by re-writing were considered sufficiently valuable to warrant the time and effort involved in cycling them.

Hypothesis #3. Non-medical staff members are able to improve the quality of items by revising them prior to cycling.

Non-medical staff members expressed confidence that they could take items initially judged as "bad", and by re-writing them improve the quality sufficiently to make them acceptable for inclusion in the test bank. Since previous experiments had established correlation between the staff judgments of "good" and "bad" items and those of the clinician judges, a number of the "bad" items were re-written by non-medical staff and cycled along with a control group of items which had initially been judged "good" by the staff.

The results of the experiment indicated that the clinician judges gave the same ratings to the modified items as to those initially judged "good". Consequently, attrition of items could be reduced by having non-medical staff members revise certain ones.

Hypothesis #4. The fact that some judges are given the opportunity to opt out of responding to an item does not affect the pattern of responses.

The clinician judges were asked to make their judgments in the broad terms of clinical practice, rather than in reference to their specific practices. It was thought that some reviewers might feel unqualified, or at least uncomfortable, when an item dealt with a topic where they had no direct experience. For this reason, specific items were cycled to two groups of physicians; one was required to make judgments on all items, and the other was given the option of not responding to certain items.

The results of the experiment indicated that it made no difference in the item ratings if a judge had the ability to opt out, or not. Consequently, the necessity to re-cycle certain questions where the initial judge did not respond was avoided.

Hypothesis #5. The method used to print an item does not affect the response given to the item.

The most convenient method by which the staff could transmit a specific item to a judge was in computer printout. Since this was in capital letters, and in a form unfamiliar to the clinician, it was thought this might have an effect on the results. Consequently, the same items were cycled to clinician judges in computer printout and typewritten format.

The method used to print the item did not noticeably affect the response given to the item, and consequently the more convenient computer printout form could be used.

Hypothesis #6. Including a reminder concerning the criticality of careful responses does not affect the pattern of responses.

It was feared that as a clinician became more familiar with the review process, his consideration of individual items would become more hurried and superficial. Consequently, in the final experiment the same items were sent to two groups; one recieved a reminder of the critical nature of the judgments and the other did not.

Results of the experiment indicated that the reminder did not affect the rating given an item, implying that the clinicians did not need to be reminded of the importance of their judgments.

Hypothesis #7. The number of items a clinician is asked to review at one time may affect his efficiency and effectiveness.

There was need to cycle the maximum number of questions in the shortest possible time, consequently data were desirable on the most reasonable number to send. One factor was that a busy physician might be more likely to promptly complete review of a limited number of questions, but would put aside a greater number until he had a sufficient block of time available to complete the task. A second factor involved the possibility of fatigue, which would make judgments

on the last questions reviewed less valuable. Consequently, packets containing varying numbers of questions were sent to different groups of physicians.

The results indicated that physicians were more likely to return packets containing 12 items promptly than those containing a greater number of items. The ratings involving packets containing 12 questions also showed less variance than those containing more items.

Since the item cycle and experiments may be of value to others interested in medical testing, they will be reported in greater detail at a later date, including experimental design, data obtained, statistical treatment of the data, and basis for the conclusions.

As a result of the cycling process, and the experiments conducted prior to development of the test bank, the study staff has confidence that a unique resource has been developed to meet the requirements of the research. Equally important, the test bank of approximately 2,000 items is now considered the base of a more substantial test bank which, with additions and modifications, can serve a variety of needs in testing throughout the continuum of medical education.

Appendix B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FL    ?
387 170821    175995    168782                    1001                                    70 C
387101    A PATIENT IS BROUGHT TO THE EMERGENCY ROOM FOLLOWING AN AUTOMOBILE
387102    ACCIDENT.  IT IS CLEAR THAT THE PATIENT IS SERIOUSLY INJURED.  HE
387103    APPEARS TO BE IN SHOCK WITH FRACTURES OF BOTH FEMURS. YOUR FIRST STEP
387104    SHOULD BE TO:
387105    A.  SPLINT FRACTURES WHILE RAPID CROSS-MATCHING WAS PERFORMED AND THEN
387106    START WHOLE BLOOD I.V.
387107    B.  CHECK FOR HEMORRHAGE AND WHILE DOING THIS, HAVE A PLASMA EXPANDER
387108    STARTED I.V.
387109    C.  CHECK FOR ADEQUATE AIRWAY AND WHEN THIS IS ASSURED GO ON TO TREAT
387110    FOR SHOCK
387111    D.  GIVE MORPHINE SULPHATE, AND SPLINT THE LEGS
387112    E.  DO A COMPLETE PHYSICAL TO DETERMINE THE EXTENT OF HIS INJURIES    S
2815 172814                                       2001                                    70 B
281501    A 20 YEAR OLD MAN HAS A SIMPLE FRACTURE THROUGH THE MID PART OF THE
281502    LEFT CARPAL NAVICULAR BONE WITH NO DISPLACEMENT OF THE FRAGMENTS.
281503    AFTER ADEQUATE IMMOBILIZATION FOR 2 MONTHS X-RAYS SHOW NO EVIDENCE OF
281504    HEALING. SUBSEQUENTLY PREFERRED TREATMENT WOULD BE:
281505    A.  REMOVE CAST AND START MOVEMENTS
281506    B.  CONTINUE IMMOBILIZATION IN PLASTER
281507    C.  DRILLING ACROSS FRACTURE SITE
281508    D.  INSERTION OF BONE PEG
281509    E.  ANABOLIC HORMONES                                                          S
2825 170817                                       2001                                    70 C
282601    IN FRACTURES OF THE BONES OF THE FOREARM, THE MOST IMPORTANT FACTOR
282602    CAUSING DISPLACEMENT OF THE FRAGMENTS IS:
282603    A.  AGE OF THE PATIENT
282604    B.  DIRECTION OF THE FORCE CAUSING THE FRACTURE
282605    C.  THE ATTACHED MUSCLE PULL
282606    D.  IMPROPER SPLINTING                                                         S
0164 17JE91    180020                             2000                                    70 D
016401    TWO DAYS AGO A 40 YEAR OLD HOUSEWIFE INJURED HERSELF WITH A GARDEN
016402    STAKE INDUCING A LACERATION OF THE SKIN IN THE RIGHT POPLITEAL SPACE.
016403    AT THE PRESENT TIME, THE WOUND AND SURROUNDING TISSUE APPEAR INFECTED.
016404    SHE STATES THAT SHE HAD NEVER BEEN IMMUNIZED AGAINST TETANUS. AFTER
016405    CLEANSING, DEBRIDEMENT AND DRESSING OF THE WOUND, THE BEST TREATMENT
016406    WOULD BE:
016407    A.  BACITRACIN OINTMENT AND ALUM PRECIPITATED TETANUS TOXOID
016408    B.  PENICILLIN AND AQUEOUS TETANUS TOXOID
016409    C.  BACITRACIN OINTMENT AND 3,000 UNITS OF EQUINE TETANUS ANTITOXIN
016410    D.  PENICILLIN AND 400 UNITS OF HUMAN TETANUS ANTITOXIN
016411    E.  PENICILLIN AND LOCAL BACITRACIN OINTMENT                                   S
3873 170821                                       1001                                    70 E
387301    IN FRACTURES OF THE FEMORAL SHAFT IN CHILDREN, BRYANT'S TRACTION IS
387302    CONSIDERED THE TREATMENT OF CHOICE UP TO WHAT AGE:
387303    A.  TWO YEARS
387304    B.  FOUR YEARS
387305    C.  SIX YEARS
387306    D.  TEN YEARS
387307    E.  BOTH AGE AND WEIGHT SHOULD BE CONSIDERED                                   S
3779 170861    170862                             3001                                    70 C
37 1    WHICH ONE OF THE FOLLOWING IS NOT A POSSIBLE CONSEQUENCE OF TRAUMA
377902    TO THE ANTERIOR CHEST:
377903    A.  DISSECTION OF THE AORTA
377904    B.  CONTUSION OF THE LUNGS
```

377905 C. PARADOXICAL EMBOLIZATION
377906 D. HEMORRHAGIC PERICARDITIS
377(07 E. PREMATURE VENTRICULAR CONTRACTIONS e
3397 179814 177725 179813 178807 2001 59 A
339701 WHICH OF THE FOLLOWING FRACTURES WHICH MAY NOT BE INITIALLY EVIDENT
339702 RADIOGRAPHICALLY MAY GIVE RISE TO CHRONIC CLINICAL DISABILITY:
339703 A. FRACTURE OF THE CARPAL NAVICULAR
339704 B. MARCH FRACTURE
339705 C. PIP FRACTURE
339706 D. COMMINUTED COLLES' FRACTURE
339707 E. FRACTURE OF THE BASE OF THE 5TH METATARSAL $
2988 175995 158796 1001 70 D
298401 A YOUNG MAN IS BROUGHT INTO THE EMERGENCY ROOM WITH ACUTE RESPIRATORY
298402 FAILURE DUE TO A HEAD INJURY. YOUR EMERGENCY CARE WOULD INCLUDE ALL
298403 THE FOLLOWING EXCEPT WHICH ONE:
298404 A. ESTABLISH AIRWAY
298405 B. GIVE RESUSCITATIVE VENTILATION
298406 C. GIVE OXYGEN
298407 D. GIVE SEDATIVE FOR PAIN
298408 E. EXAMINE TO EXCLUDE INTERNAL BLEEDING $
2811 170943 2011 70 D
281101 IN SPITE OF ADVANCES IN TREATMENT, THE MOST COMMON CAUSE OF DEATH IN
281102 BURN CASES IS:
281103 A. BURN SHOCK
281104 B. HEPATIC COMA
281105 C. HEMORRHAGE FROM A CURLING'S ULCER
281106 D. INFECTION
281107 E. ELECTROLYTE IMBALANCE $
11 170960 3110 59 D
112601 WHICH OF THE FOLLOWING ARE THE MOST EASILY DEMONSTRABLE EARLY MANI-
112602 FESTATIONS OF BONE MARROW INHIBITION FROM CHLORAMPHENICOL
112603 (CHLOROMYCETIN RX):
112604 A. NUCLEATED RED BLOOD CELLS AND MITOTIC FIGURES IN THE BLOOD
112605 B. THROMBOCYTOPENIA AND DECREASED STICKINESS OF PLATELETS
112606 C. MEGALOBLASTIC CHANGE IN THE BONE MARROW AND MACROCYTES IN THE
112607 PERIPHERAL BLOOD
112608 D. RETICULOCYTOPENIA AND HYPERFERREMIA
112609 E. BONE MARROW APLASIA AND PANCYTOPENIA e
1040 179813 2001 59 B
104001 WHICH OF THE FOLLOWING FRACTURES IS USUALLY TREATED WITHOUT PLASTER
104002 IMMOBILIZATION:
104003 A. TRANSVERSE PATELLAR
104004 B. IMPACTED SURGICAL NECK OF HUMERUS
104005 C. GREENSTICK FRACTURE OF BOTH BONES OF FOREARM
104006 D. MID-NAVICULAR
104007 E. MEDIAL MALLEOLUS OF TIBIA e
1027 179843 3022 59 B
102701 SEVERE BURNS PRODUCE WHAT EFFECT UPON THE LEVEL OF GAMMA GOBULIN IN
102702 THE FIRST WEEK FOLLOWING THE BURN:
102703 A. MARKED INCREASE
102704 B. MARKED DECREASE
102705 C. NO SIGNIFICANT CHANGE $
1017 179854 1001 59 C
101(01 A YOUNG MAN IS ADMITTED TO THE HOSPITAL FOLLOWING A FALL FROM A HORSE
101-02 IN WHICH HE STRUCK HIS HEAD UPON A FENCE POLE. ALTHOUGH HIS SENSORIUM
101703 WAS NORMAL UPON ADMISSION, WITHIN ONE HOUR HE IS STUPOROUS, THE RIGHT
101704 PUPIL IS DILATED AND THE LEFT CONSTRICTED. THE EMERGENCY TREATMENT

,B-3 OTHER RESPIRATORY DISEASES
•GET,DOCTOR,OTHER RESPIRATORY DISEASES
DOCTOR
OTHER RESPIRATORY DISEASES
AWAY
CONFERENCES

10396 ENTRY DATE 05/03/71 DELETE DATE 05/14/71
INTRODUCTION TO ALLERGY
SPONSOR- USAF SURG. GEN., RANDOLPH AFB.
SAN ANTONIO, TEXAS
LOCATION- SAME ADDRESS
FEE- NONE FOR- S, LIMIT 4
LENGTH- 10 DAYS, 80 HOURS
METHODS- CLIN C, LEC, LC, SEM

10297 ENTRY DATE 05/10/71 DELETE DATE 05/14/71
CLINICAL ALLERGY
SPONSOR- THE ROOSEVELT HOSP.
428 W. 59TH. ST., NEW YORK, N.Y. 10019
LOCATION- SAME ADDRESS
FEE- $100.00 FOR- B; LIMIT: 7
LENGTH- 5 DAYS, 40 HOURS
METHODS- AV, CLIN C, LEC, D, PAN, SEM

10611 ENTRY DATE 06/24/71 DELETE DATE 06/26/71
RESPIRATORY DISEASES FOR THE FAMILY PHYSICIAN
SPONSOR- MOUND PARK HOSP. FOUND., INC.
701 6TH. ST., S., ST. PETERSBURG, FLORIDA 33701
LOCATION- TEACHING AUDITORIUM, BAYFRONT MED CNTR.
701 6TH. ST., S., ST. PETERSBURG, FLORIDA 33701
FEE- $50 FOR- B, LIMIT 50
LENGTH- 3 DAYS, 18 HRS
METHODS- AV, CLIN C, LEC, LC, D, PAN, PD, PI, SEM

11219 ENTRY DATE 07/27/71 DELETE DATE 07/29/71
PEDIATRIC ALLERGY
SPONSOR- AMER ACAD OF PEDIATRICS, 1801 HINMAN AVE,
EVANSTON, ILL 60204
LOCATION- NATL JEWISH HOSP & RESEARCH CNTR, DENVER
FEE- $75/MEMBER,$105/NONMEMBER FOR- S, LIMIT 10
LENGTH- 3 DAYS, 24 HRS.
METHODS- AV, LEC, LC, D, PAN, SEM

HOME
AUDIOVISUAL

30184 ENTRY DATE 01/01/63 DELETE DATE 99/99/99
TAPE- AUTOIMMUNE DISEASE
AUTHOR- BURNET, FUDENBERG, HOLMEN, PEARSON
SERIES- AUDIO-DIGEST FOUNDATION TAPE (SEE KEY FOR ADDRESS)
LENGTH- 60:00 MIN CALL NO: IM-10-8 DATE-1963
PRICE- $4.00 OPEN REEL, $4.50 CASSETTE

30352 ENTRY DATE 01/01/65 DELETE DATE 99/99/99
TAPE- A CONSULTATION HOUR ON PEDIATRIC ALLERGY
AUTHOR- FOUBERT, FRAZIER, GLASER, HEIMLICH, HEIDORFF, PESHKIN
SERIES- AUDIO-DIGEST FOUNDATION TAPE (SEE KEY FOR ADDRESS)
LENGTH- 60:00 MIN CALL NO: P-11-10 DATE-1965
PRICE- $4.00 OPEN REEL, $4.50 CASSETTE

30390 ENTRY DATE 01/01/65 DELETE DATE 99/99/99
TAPE- PREOPERATIVE MANAGEMENT OF PULMONARY, RENAL AND CARDIAC INSUFFICIENCY
AUTHOR- HATCH,MOORE,RAY
SERIES- AUDIO-DIGEST FOUNDATION TAPE (SEE KEY FOR ADDRESS)
LENGTH- 60:00 MIN. CALL NO:5-10-12 DATE-1965
PRICE- $4.00/OPEN REEL,$4.50/CASSETTE

20294 ENTRY DATE 01/01/66 DELETE DATE 99/99/99
TAPE- ETIOLOGY, DIAGNOSIS AND TREATMENT OF ACUTE PULMONARY EDEMA
AUTHOR- JOHN RANKIN
SERIES- WISCONSIN DIAL ACCESS TAPES (SEE KEY FOR ADDRESS)
LENGTH- 5:20 MIN CALL NO: 74 DATE-1966
PRICE- $4.00/AUDIO-TAPE 1/4 IN.,$10.00/ECHOMATIC CARTRIDGE
COMMENTS- INFORMATION TO CALL TOLL-FREE SEE KEY

20295 ENTRY DATE 01/01/66 DELETE DATE 99/99/99
TAPE- SPONTANEOUS PNEUMOTHORAX
AUTHOR- JOHN BENFIELD
SERIES- WISCONSIN DIAL ACCESS TAPES (SEE KEY FOR ADDRESS)
LENGTH- 5:35 MIN CALL NO: 67 DATE-1966
PRICE- $4.00/AUDIO-TAPE 1/4 IN.,$10.00/ECHOMATIC CARTRIDGE
COMMENTS- INFORMATION TO CALL TOLL-FREE SEE KEY

20201 ENTRY DATE 01/01/66 DELETE DATE 99/99/99
TAPE- MANAGEMENT OF PULMONARY INSUFFICIENCY
AUTHOR- AYRES, BIRD, MOTLEY, PLUM, RILEY
SERIES- AUDIO-DIGEST FOUNDATION TAPE (SEE KEY FOR ADDRESS)
LENGTH- 60:00 MIN CALL NO: IM-13-21 DATE-1966
PRICE- $4.00 OPEN REEL, $4.50 CASSETTE

20296 ENTRY DATE 01/01/67 DELETE DATE 99/99/99
TAPE- SILO FILLER'S DISEASE, RECOGNITION AND TREATMENT
AUTHOR- J. RANKIN
SERIES- WISCONSIN DIAL ACCESS TAPES (SEE KEY FOR ADDRESS)
LENGTH- 3:30 MIN CALL NO: 164 DATE-1967
PRICE- $4.00/AUDIO-TAPE 1/4 IN.,$10.00/ECHOMATIC CARTRIDGE

Appendix D

Medical Questionaire System

Introduction

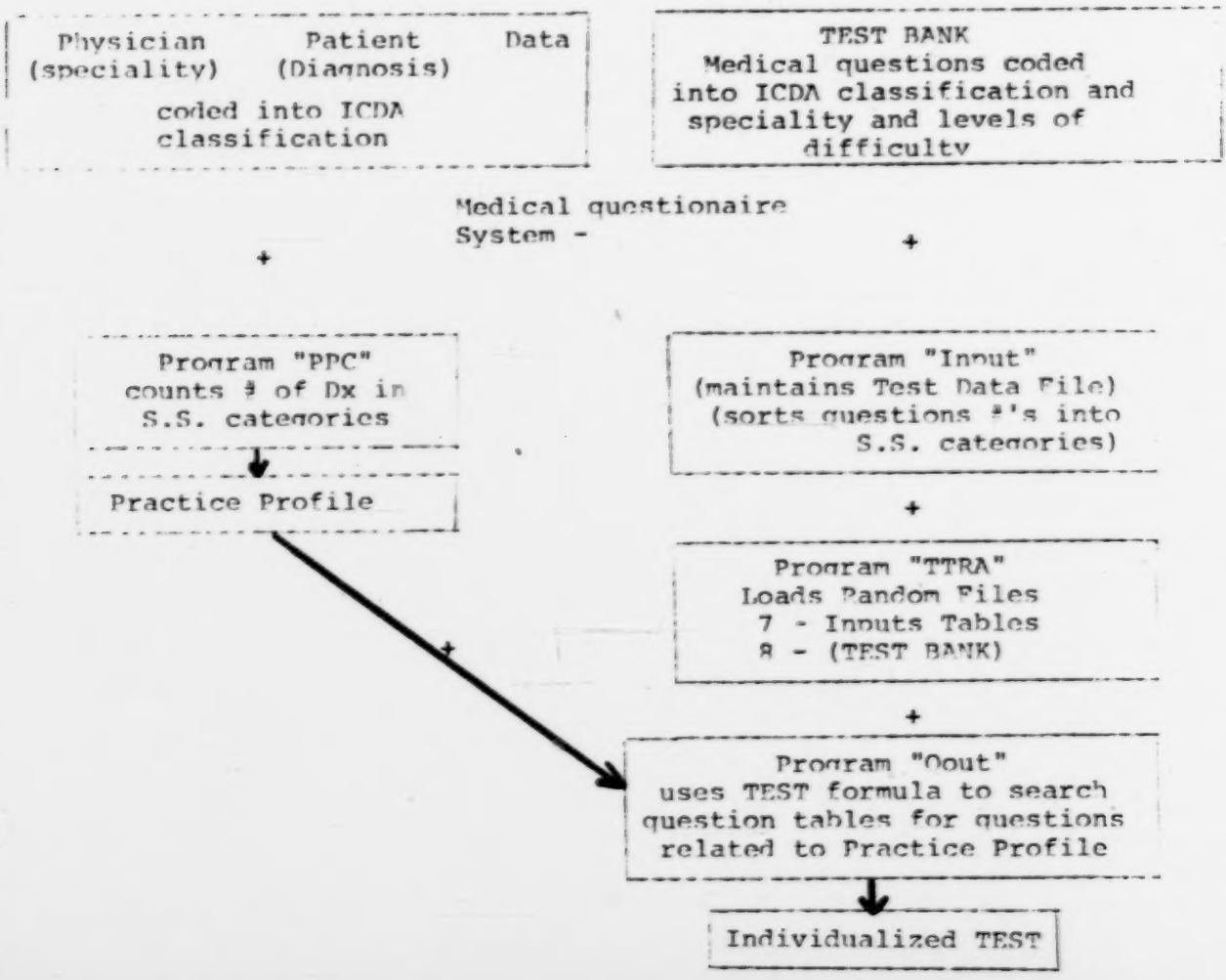
The Medical Questionaire System is a group of 4 programs called Input, PPC, TTRA, QOUT. It was designed to produce individualized examinations for physicians based upon the diagnoses each physician made on his patients.

General Approach

All Medical questions and physician/patient data are coded into the ICDA (revised) classification of diseases and also according to speciality levels. The patient data and physician speciality is read by program P.P.C. The medical questions information is read by program Input.

Program TTRA - loads the random access files 7 & 8

Program Qout - generates a medical examination based on the practice profile.


Physician (speciality)
Patient (Diagnosis)
Data
coded into ICDA classification
TEST BANK
Medical questions coded into ICDA classification and speciality and levels of difficulty
Medical questionaire System -
Program "PPC" counts # of Dx in S.S. categories
Practice Profile
Program "Input" (maintains Test Data File) (sorts questions #'s into S.S. categories)
Program "TTRA" Loads Random Files 7 - Inputs Tables 8 - (TEST BANK)
Program "Qout" uses TEST formula to search question tables for questions related to Practice Profile
Individualized TEST

Language

The program is written in Fortran V and Assembler language to run on the Univac 1108 using a medium density, 7 tract odd parity tape. The system uses some of the features of the 1108 operating system.

Limitations of Program

1. A maximum of 12,000 questions in Test Bank.
2. Questions can be coded into a maximum of 800 S.S. categories. Our ICDA classification has 912.
3. A maximum of 150 questions can be coded into one S.S. category.
4. A question has a maximum length of 100 cards.

Organization of the Program

The system has two basic operations:

1. File Maintenance - necessary to change or add information to the file. This updating is done by program Input. The update cards are made out according to standard rules for updating Univac 1108 files, using the correction statements.
2. File retrieval - the main function of the retrieval operation is to produce an examination of medical questions based upon the physician patient data (practice profile)

General Considerations

The information on the question cards and the physician patient data cards must conform to a definite format to function within the program.

A series of safe guards is built into the program to catch errors in the input data. Discovery of an error will suppress execution of the data set, but will allow the input to be read and printed and later checked for errors.

Using the Program

Input Program

This program updates the test data file, (file 2 of Master Tape TO) performs error checking and sets up the necessary tables to search the test bank. It creates the new master tape TO.

"INPUT" uses a segmented load routine. "Input" (main) driver calls routines IN1, IN2, IN3. The scratch file units used by Input and what is stored on them is as follows:

8-25 (one for each category (1-18) - question sequence numbers in categories. Number of S.S. categories are noted)

26- (number of questions in S.S. categories number of questions in levels of speciality in S.S. categories)

27- (accession number for question, level number of question, starting card number for question, number of cards in each question)

28- (question sequence numbers are stored here after being sorted by S.S. categories)

29- Master Tape (TO)

Input (main) - Driver Routines

Pass I	Pass II	Pass III
IN_1 (main subroutine) Reads Checks coding errors Creates intermediate Files 8-25 (Category 1-18)	IN_2 (main subroutine) sorts question # into S.S. categories	IN_3 - (main subroutine) Writes out TO (new Master File)
	Tins - reads Files 8-25	Tidio - reads File 27
Tout - writes out Files 8-25 # of S.S. categories 0 # in S.S. category	Tin links Tins + $1N_2$	INPO - reads File 28
	Sort 2 - Schell sort	TPNDO - writes File 29 (new Master File)
TIDOO - writes File 27 Acc. # of question Level # of question # of cards in question	TOTO - Writes File 28 sorted question #'s in sequence	TFSO - TPNO - Blocking for IN_3 (Tables for retrieval program)

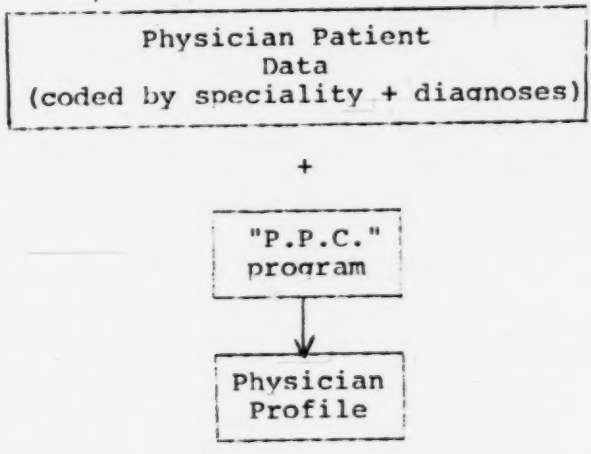
P.P.C. Program

This program reads physician speciality code and coded diagnoses in card images, (one card per patient, six possible diagnoses/patient)

The program counts and prints out the total number of diagnoses in each sub-sub category resulting in the practice profile.

Other calculations which are made, but not printed are:

1. Number of S.S. categories with diagnoses.
2. Number of S.S. categories in each category with diagnoses.
3. Number of total diagnoses in each category.



TTRA Program

This program reads in "TQ" (Master File) and writes or loads units "7 & 8" in random access format.

"Unit 7" contains the test Data File (File 2 of Master Tape "TQ"). It is a series of question information tables which point to questions in the Question Bank.

"Unit 8" contains the Question Bank.

These files are to be used by "Qout" program to generate the examination.

Appendix E

Educational Resource Index

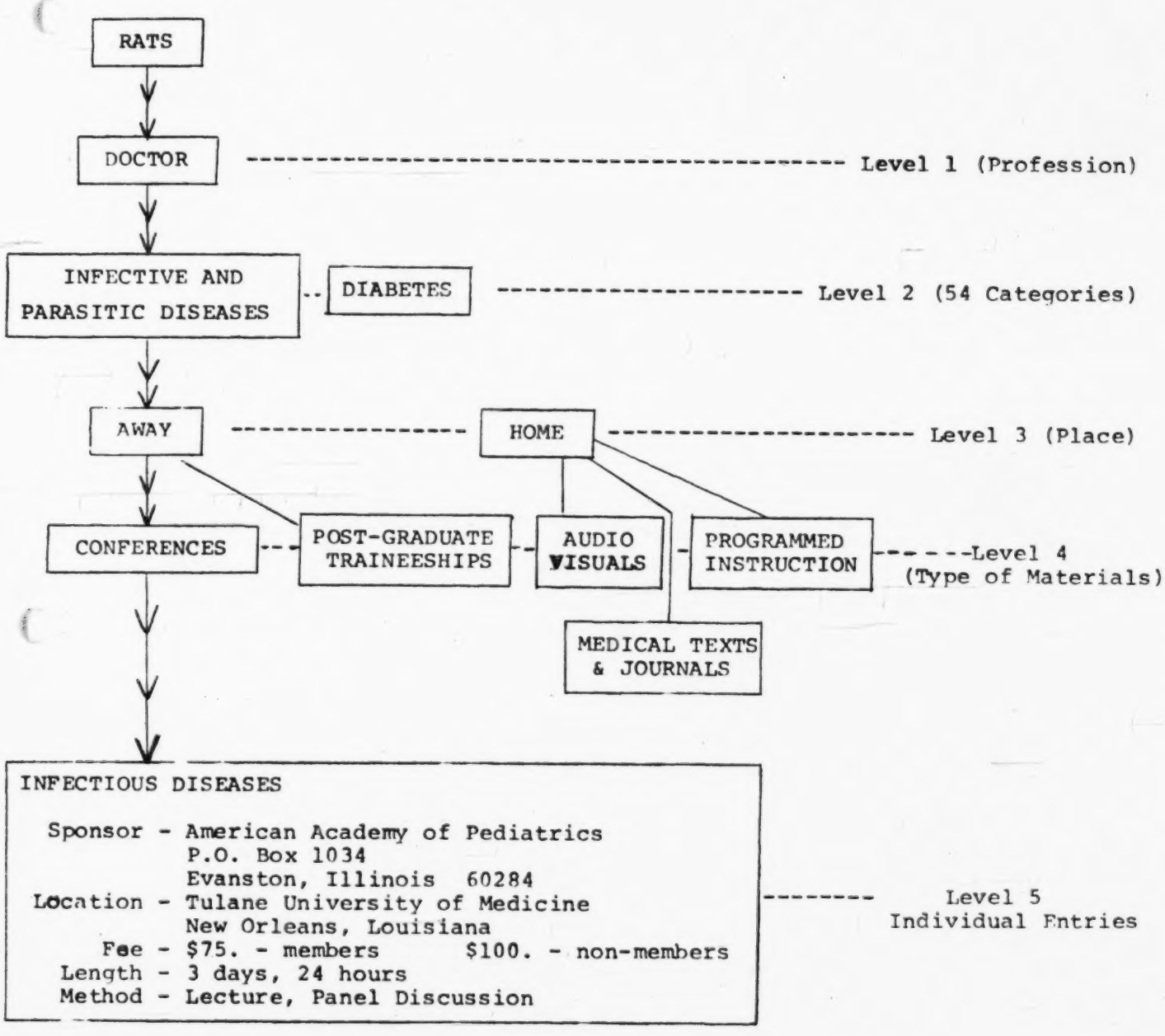
"Rats" System

Introduction

"Rats" is an acronym for an information Retrieval system using an Associated Tree Structure format. It uses the hierarchical file structure of levels. Postgraduate educational materials for the health sciences professions can be categorized into four levels. We are using the program to provide physicians with a list of educational opportunities in specific areas of Medicine, to supplement a project entitled "Individual Physician Profile."

General Approach

All educational materials are coded into a modified version of the ICDA (revised) consisting of 54 categories (see Appendix - Exhibit 1). The information is retrieved by listing level names. The following flow chart will illustrate the structure and retrieval aspects of the program.



[Retrieval listing level names]

*Get, Doctor, Infective & Parasitic Diseases, Away, Conferences.
(Level 1) (Level 2) (Level 3) (Level 4)

following the arrows in the flow chart, the above retrieval card will list out the sample resource material.

Thus, using this structured system, only material useful to a physician is utilized. For example:

A physician who states he cannot leave his practice will not be sent "Away" materials, but "Home" resources will serve his purpose. If he states he learns "by doing," he will be guided into postgraduate traineeships. It is a tailor-made program for the area of Medicine and the type of resource suitable for the individual physician.

Added Feature

An added capability of the system makes it serve more as a net rather than like a tree structure. If the first category had the entries designated for doctors and nurses, entries do not have to be duplicated in both professional fields.

They can be connected by nodes within the levels or upward or downward between different levels.

Language

The program is written in Cobal, to run on the Univac 1108.

Organization of the Program

The "Rats" system has three basic operations: (1) File Creation, (2) Retrieval and (3) File Maintenance.

1. File Creation

This operation is done only once for a particular set of data simply because no previous file exists. The data is supplied by the user. The file, thus created is used by the Retrieval system to retrieve materials requested by the user. Creation is accomplished by proper set of systems control cards and program control cards (Exhibit 2 and 2a). During the create run a table of possible names is provided for all level names. A number of possible levels is determined at that time. Various control cards require a list of these names, one from each level. This list is called a classification and in each classification a name for each level is necessary. The order of the names determines the order these names will appear in the retrieval print-outs.

2. Retrieval

The main function for the retrieval program is *get. It is followed by a classification and is used in many ways.

Two added functions will allow extra information to be printed in the retrieval print-out.

*HDG - prints out any information desired by user, then

ejects a page first and prints-out on the top of the next page.

CMT - (Comment) - prints the rest of the card as it is.

These functions can be interspersed in the retrieval requests and identify different segments of the print-out.

3. File Maintenance

It becomes necessary to change information on a file because of mistakes in the creation or due to obsolete information. Updating falls into three functions.

*Add - adds a new entry.
*Update - changes one or more items in an entry.
*Also - links nodes within the system.

General Considerations

Each entry is a group of cards on which anything may be printed. This information is referred to as a blurb and is printed upon retrieval and is not used for control information. Each entry, which consists of one or more cards is delimited by an *ADD control statement. This enables the user to submit entries in either the create or update node.

Control Cards

All control cards have a basic format. Each one has an asterick(*) in column 1 followed by a function name. All items which follow are peculiar to each function name and are separated by commas in the free field format. The function names used are *GET, *CMT, *HDG, *ADD, *DROP, *UPDATE, *ALSO.

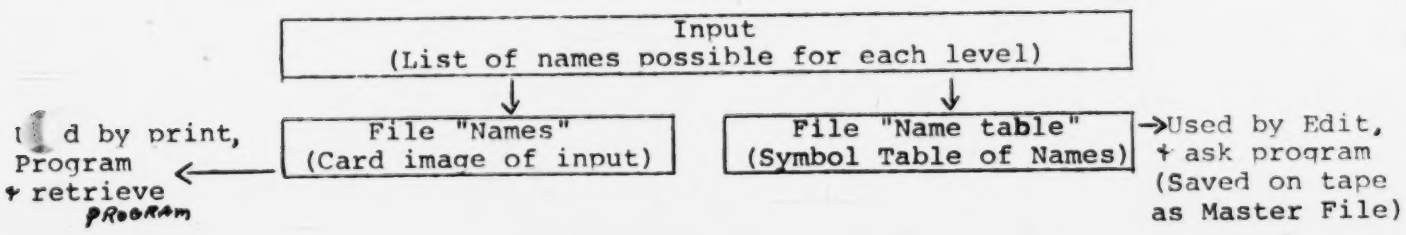
Using the Program

The "Rats" system consists of eight programs and three sorts. Communication between these programs is accomplished through storage on Disk.

Create System
(uses all programs used in update system)

1. Make name

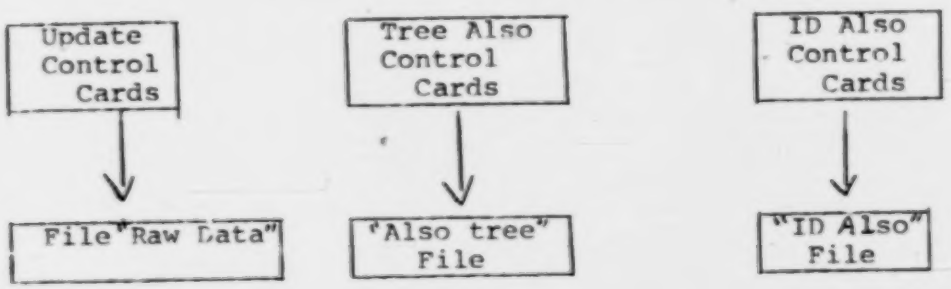
This program creates two files called "nametable" and "names."

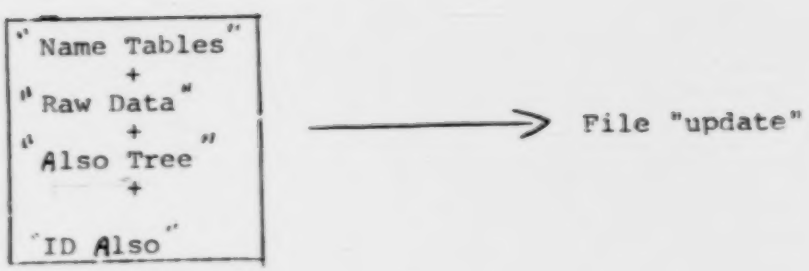


UPDATE SYSTEM

2. Edit

This program reads update control cards and transforms them into control records by the update program.





3. Sort Updates

This program sorts the "updates" file. Updating is done sequentially; therefore, the update control information must be in sequential order. The Functions for a single ID always must appear in a fixed order: DROP, ADD, UPDATE, ALSO.

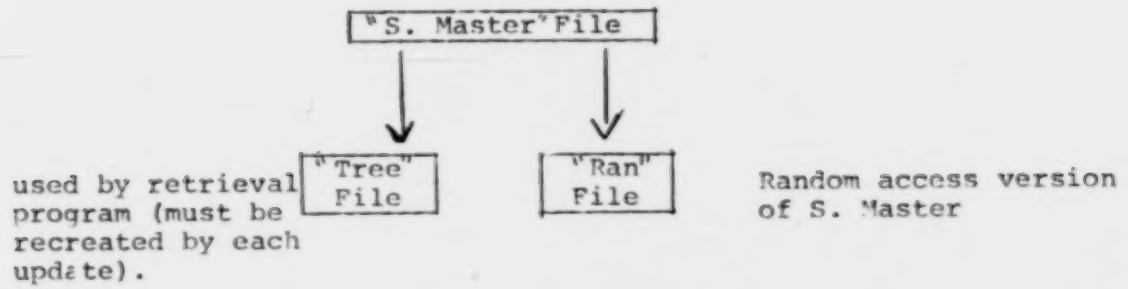
4. Updates

5. Sortmaster

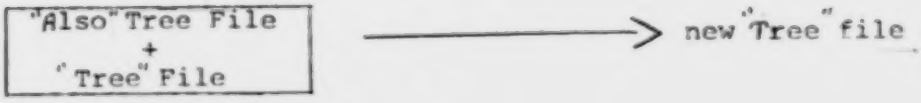
This program sorts the "S. Master" File by categories preparing it for input to make tree.

6. Make Tree

This program uses "S. Master" and produces two files:


"S. Master" File
"Tree" File
"Ran" File
used by retrieval program (must be recreated by each update).
Random access version of S. Master

6A. Link

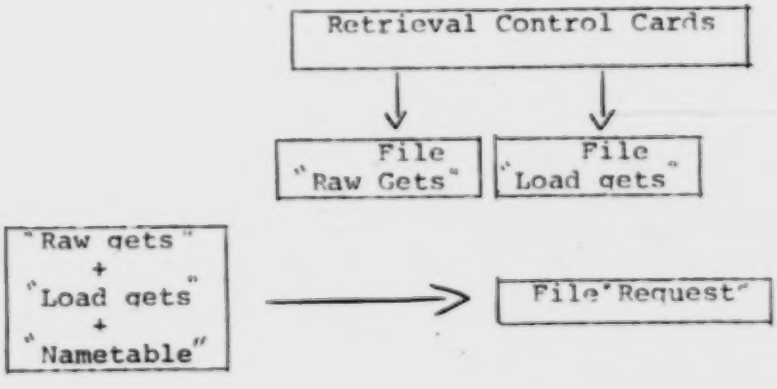


Note: 'tree-also' control cards must be included in each update run unless no changes are made or if 'also tree' file is saved on tape.

Retrieval System

7. Ask

Ask reads the retrieval control cards and translates them into control information for File "Request."



8. Retrieve

This program uses: